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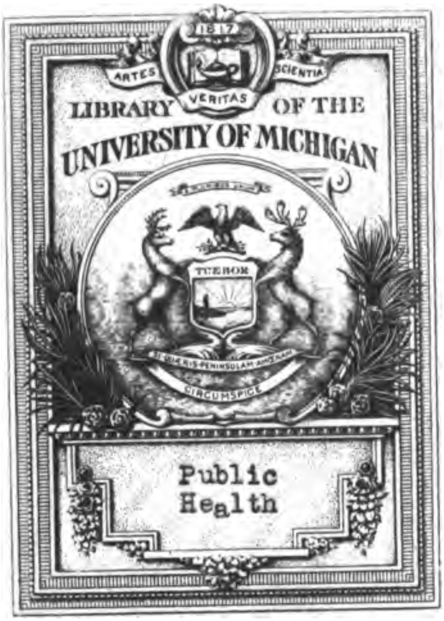

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THIRTY-SEVENTH ANNUAL REPORT

OF THE

SECRETARY

OF THE

STATE BOARD OF HEALTH

OF THE

STATE OF MICHIGAN

FOR THE

FISCAL YEAR ENDING JUNE 30, 1909.

BY AUTHORITY

LANSING, MICHIGAN
WYNKOOP HALLENBECK CRAWFORD COMPANY, STATE PRINTERS
1910

Public Health
gift
Henry F. Vaughan
3-16-44

LETTER OF TRANSMITTAL.

Office of the
Secretary of the State Board of Health,
Lansing, Michigan, December, 1909.

To Hon. Fred M. Warner, *Governor of Michigan:*

Sir:—In compliance with the laws of this State, I present to you the accompanying report for the fiscal year ending June 30, 1909.

Very respectfully,
FRANK W. SHUMWAY,
Secretary of the State Board of Health.

MEMBERS

OF THE

MICHIGAN STATE BOARD OF HEALTH.

	TERM EXPIRES.
Angus McLean, M. D., *President,* Detroit	January 31, 1911.
Malcolm C. Sinclair, M. D., Vice-President, Grand Rapids	January 31, 1911.
Frank W. Shumway, M. D., *Secretary and Executive Officer,* Lansing	March 30, 1911.
Victor C. Vaughan, M. D., Ph. D., Ann Arbor	January 31, 1913.
Aaron R. Wheeler, M. D., St. Louis	January 31, 1913.
Charles A. Blake, Detroit	January 31, 1915.
Charles M. Ranger, A. B., Battle Creek	January 31, 1915.

CONTENTS.

	Page.
Title page	1
Letter of transmittal to Governor Warner	3
Members of the State Board of Health	5
Contents	7
Regular and special meetings of the Board, fiscal year, 1909	11–13
Examination of plans for State buildings	13
Examination and licensing of embalmers	13
General work and expenditures, in the office of the secretary, fiscal year 1909	14–39
Public health legislation in Michigan in 1908	39–57
Michigan State Sanatorium for the treatment of incipient tuberculosis	58–63
Communicable diseases, in Michigan, in 1908 and preceding years	67–196
Introduction	67–68
Pneumonia	68–82
Tuberculosis	82–103
Meningitis	103–114
Typhoid fever	114–132
Diphtheria	132–147
Whooping-cough	147–153
Scarlet fever	153–166
Measles	166–176
Smallpox	176–194
Chicken-pox (Varicella)	194
Mumps (Parotitis)	194
Erysipelas	194
Puerperal fever	194
Itch (Scabies)	195
Tetanus (Lock-jaw)	195
Tyrotoxicon poisoning	195
Dysentery	195
Disease of animals dangerous to man in Michigan in 1908	196
Rabies (Hydrophobia)	196
Alleged nuisances in Michigan in 1908	196

PART I.

REPORT OF THE SECRETARY FOR THE FISCAL YEAR, JULY 1, 1908, TO JUNE 30, 1909.

EXTRACTS FROM MINUTES OF BOARD MEETINGS.

ADJOURNED REGULAR MEETING, HELD AT GRAND RAPIDS, JULY 29, 1908.

The members present were: Vice-President Malcolm C. Sinclair, M. D., Grand Rapids; Victor C. Vaughan, M. D. Ann Arbor; C. M. Ranger, A. B., Battle Creek, and Frank W. Shumway, M. D., Secretary.

Secretary Shumway was appointed the delegate of this Board to attend the meeting of the Section of Vital Statistics, American Public Health Association, to be held at Winnipeg, August 22-26, 1908. He was also appointed to represent this Board at the International Congress on Tuberculosis at Washington, September-October, 1908.

On motion of Dr. Shumway, Dr. Vaughan and Mr. Ranger were appointed delegates to represent this Board at the conference between the State Boards of Health and the Embalmers' Examining Boards to be held at Washington, D. C., October 2-3, 1908.

REGULAR MEETING, HELD AT LANSING, OCTOBER 9, 1908.

The members present were: President Angus McLean, M. D., Vice-President Malcolm C. Sinclair, M. D., (by proxy), Charles M. Ranger, A. B., and F. W. Shumway, M. D., Secretary.

The time of this meeting was taken up, principally, in discussing charges embodied in an affidavit, in which it was claimed that certain persons, who had taken an embalmers' examination, should not be granted their licenses owing to ineligibility. Mr. Ranger and Dr. Shumway were appointed a committee to investigate the charges.

SPECIAL MEETING, HELD AT MARQUETTE, OCTOBER 28-29, 1908.

The members present were: Charles M. Ranger, A. B., F. W. Shumway, M. D., Secretary, A. R. Wheeler, M. D., and Malcolm C. Sinclair, M. D., (by proxy).

This meeting was called for the purpose of conducting an embalmers' examination, twelve candidates being examined.

REGULAR MEETING, HELD AT LANSING, NOVEMBER 18 AND 19, 1908.

The members present were: Charles M. Ranger, A. B., and F. W. Shumway, M. D. Secretary.

At this meeting was conducted the regular annual embalmers' examination, which was authorized by this Board to be held in Lansing each year on the third Wednesday of November. Twenty-seven applicants were examined at this meeting.

REGULAR MEETING, HELD AT LANSING, JANUARY 8, 1909.

The members present were: President Angus McLean, M. D., Vice President Malcolm C. Sinclair, M. D., Aaron R. Wheeler, M. D., Charles M. Ranger, A. B., Hon. Coleman C. Vaughan and F. W. Shumway, M. D., Secretary.

Mr. Ranger and Dr. Shumway, the committee appointed, at a former meeting, to investigate charges made in an affidavit relative to certain parties being ineligible, and who, therefore, should not be granted embalmers' licenses, submitted their report on the same. They stated in this report that, after listening to the arguments of all parties concerned, in their opinion, there had been no intended misrepresentation on the part of the accused, who, therefore, ought to be granted their licenses. The recommendation embodied in the report was concurred in by the Board, and the licenses granted.

The Board then considered the suggestion of Dr. Shumway, relative to the advisability of issuing pamphlets or leaflets treating on the subject of cancer. After due consideration, on motion of Dr. Wheeler the Secretary was authorized to have such pamphlets or leaflets, treating with all forms of cancer, printed and circulated throughout the State.

The Board, at its afternoon session, took up the subject of legislation for the improvement of the Public Health Laws. Dr. Shumway called the attention of the Board to the defects in the present laws and made suggestions as to their improvement. It was decided that a committee should be appointed to handle this subject, and Drs. McLean, Wheeler, and Shumway were appointed as the committee.

The question next considered, was that of the approval or endorsement, by this Board, of any college or school giving instruction to embalmers. After an extended discussion, it was decided that no action should be taken on this subject at present.

SPECIAL MEETING HELD AT LANSING, MARCH 9, 1909.

The members present were: President Angus McLean, M. D., Vice-President Malcolm C. Sinclair, M. D., Charles M. Ranger, A. B., and F. W. Shumway, M. D., Secretary.

The time of this meeting was taken up, largely, with the discussion of public health laws, which were to be submitted to the legislature at the present session.

REGULAR MEETING, HELD AT LANSING, APRIL 9, 1909.

The members present were: President Angus McLean, M. D., Vice-President Malcolm C. Sinclair, M. D., Charles M. Ranger, A. B., and F. W. Shumway, M. D., Secretary.

On motion of Dr. Shumway, Dr. McLean, Dr. Vaughan and Mr. Ranger were appointed a committee of this Board to act with the committee of the State Association of Funeral Directors relative to the establishment of a course of embalming in the University of Michigan.

President McLean was appointed a delegate of this Board to attend the meeting of the American Medical Association, to be held in Atlantic City, June 6, 7 and 8, 1909.

Vice-President Sinclair was appointed a delegate of this Board to attend the next meeting of the Public Health Association to be held in Atlantic City in June, 1909.

Secretary Shumway was appointed a delegate to represent this Board at the annual meeting of the National Association for the Prevention and Restriction of Tuberculosis, to be held in Washington, D. C., May 13, 14 and 15, 1909.

EXAMINATION OF PLANS FOR STATE BUILDINGS DURING THE FISCAL YEAR ENDING JUNE 30, 1909.

In compliance with Section 2229, Compiled Laws of 1897, the plans for a training school building at the Western State Normal School, Kalamazoo, and for an addition to the training school at the State Normal College, Ypsilanti, were examined by this Board, and, with the exception of a few minor changes, which were afterward incorporated in the plans, the same were approved by this Board.

EXAMINATION AND LICENSING OF EMBALMERS.

Under the provisions of Act No. 132, Laws of 1903, three examinations were held during the fiscal year ending June 30, 1909, as follows:

Grand Rapids, July 30, 31 and August 1, 1908.
Marquette, October 28 and 29, 1908.
Lansing, November 18 and 19, 1908.

Of the 149 persons examined, 134 were granted licenses.

Reciprocal licenses were granted in fifteen instances.

A statement of expenses incurred in the operation of Act 132, Laws of 1903, may be found on a subsequent page of Part I of this report.

The following letter, issued in November, 1908, will serve to show the scope of the embalmers' examinations, and the conditions to be complied with on the part of applicants for examination:

STATE BOARD OF HEALTH,
OFFICE OF THE SECRETARY, LANSING.

To the Funeral Directors and Embalmers.

GENTLEMEN:

You are hereby informed that a regular meeting of the State Board of Health, called for the purpose of conducting an embalmers' examination, will be held in the Senate Chamber, Lansing, November 18 and 19, 1908. The examination will commence at 9 o'clock, Wednesday morning, November 18.

Candidates will be required to take both *written* and *oral* examinations with demonstration on the cadaver. Oral examination will be given in the order applications are received. Some of the general subjects included in the written examination, are:

(a) Visceral anatomy and the circulation of the human body, both arterial and venous.

(b) The nature, action, modes of action and comparative value of disinfectants.

(c) The methods of embalming and preparing bodies for transportation, also shipping rules.

(d) How diseases are spread; the best methods for the restriction of diseases, and bacteriology in relation to the spread of diseases.

(e) The signs of death, and the manner in which it is determined.

Those who desire to take the examination at this time must fill out and return to the Secretary of the Board, the enclosed application blank, with an unmounted photograph of the applicant, signed in ink on the back, and properly certified to by a notary. A fee of five dollars must accompany the application. Remittances may be made by express or postoffice money order or by registered letter. *Personal checks cannot be used.*

Applications should be on file in this office *one week* before the date of the examination.

Applications must be made in the name of an individual, and not of a firm.

Applicant's name must be signed in full.

All applicants should read carefully Sections 3, 4 and 5 of the statute sent you herewith.

In the examination, a rating of seventy-five per cent or better must be made by the applicant to secure a license.

By direction of the State Board of Health. (Signed) FRANK W. SHUMWAY,
Secretary.

GENERAL AND SPECIAL WORK IN THE OFFICE OF THE SECRETARY.

Much of the general work of the office naturally groups itself under three heads,—the collection of information, the compilation of information so collected, and the dissemination of such information as will be of service in the restriction and prevention of disease.

COLLECTION OF INFORMATION.

As the local health officer is the principal medium by which this Department may reach and instruct the public in matters pertaining to the prevention of sickness and deaths, the appointment, and the return of the names and postoffice addresses of the health officers, in each year, are matters of more than ordinary interest and importance.

In each year, it is often necessary to make a first, second and third request for information which will place this office in communication with the local health officers, and during the time which is thus used up in corresponding and waiting, an outbreak of a dangerous disease may begin and become widespread before this office can afford the usual assistance to the proper officials in the locality.

It should be said, however, that there is an increasing tendency to comply with the law in this particular, and local boards of health now generally act promptly and cooperate cordially with this Department for the suppression of disease.

Having established communication with the newly appointed local health officers, pamphlets and other publications which may aid them in their work, together with the usual blanks for reports of outbreaks of diseases in their locality, are mailed from this Department. In some instances, considerable correspondence is necessary to instruct the health officials how to properly care for sick and infected persons, and to make reports which will be of value in the compilations for the annual reports and other publications of this Department.

In addition to the collection of the usual information relative to outbreaks of dangerous communicable diseases in this State, special information, upon subjects of public interest and importance, is sometimes asked for and is usually cheerfully furnished by a large number of the health officers and other persons from whom the information is sought.

DISSEMINATION OF INFORMATION.

As stated in the preceding paragraph, each newly appointed health officer is supplied, by this Department, with information relative to his duties. This information is contained principally in a pamphlet entitled "Health Officers' Manual," and in pamphlets covering the principal points in the etiology and methods of restriction and prevention of each of the dangerous communicable diseases.

Upon the receipt of information relative to an outbreak of a dangerous communicable disease, in addition to the usual instructions and blanks for making the reports, there are mailed to the health officers a sufficient number of pamphlets, relative to the particular disease then present, for distribution to the families and immediate neighbors of the sick person. In this way, the people are educated as to their duty, under the law, and their cooperation with the local health officers often secured.

A pamphlet covering the law respecting nuisances, and containing information relative to their suppression, is published, and distributed among those persons directly interested, when a complaint of a nuisance is made to this Department.

A pamphlet, giving the law, and regulations of this Department, respecting the preparation and shipment of dead bodies, is published, and distributed among the licensed embalmers, railroad officials, and other persons interested in the transportation of the dead.

ANNUAL REPORTS.

About 2,500 copies of the annual report are published each year and about 2,400 copies are distributed among the following:

Members and Ex-Members of the State Board of Health; Local Health Officers; Secretaries of State, Territorial and Provincial Boards of Health; Sanitary Journal Exchanges; Library Exchanges; City Hospitals and Sanatoriums; Presidents and Secretaries of County Medical Societies; the State Library and the Secretary of State.

NEOSTYLE WORK.

An important method of disseminating information, which has been used very extensively by this Department, is the preparation, by the Rotary Neostyle, from time to time as occasion requires, of short articles, letters, etc., upon subjects of interest to the public, and their distribution to editors of newspapers in this State, to the leading sanitary journals, and to any person who may be especially interested, or who will print or use them for the benefit of others.

During the fiscal year 1909, neostyle work to the amount of 14,353 impressions was prepared, and a large portion of it mailed as soon as prepared. The principal subjects were:

Circular letters to health officers relative to making complete final reports.
Circular letters relative to the nuisance of spitting in public places.
Circular letter to newspapers relative to hot weather diet.
Circular letter to school commissioners relative to teachers' lists.
Circular letter to registrars relative to the new embalmers' law.
Circular letter to embalmers relative to new law.
Circular letter to railroad agents relative to list of licensed embalmers.
Circular letter relative to examination of plans for State buildings.
Ten practical questions with answers relative to dangerous diseases.
Reports of proceedings of the State Board.
Circular letter to presidents of local boards of health relative to rules and regulations governing local boards.
Circular letter accompanying placards on the "Resuscitation of the Apparently Drowned."
Circular letter to health officers accompanying placards on "Flies Poison Food."
Circular letter relative to sending samples of water for analysis.
Circular letter to railroad officials relative to law regulating passenger coaches.

PUBLIC HEALTH BULLETINS.

During the fiscal year ending June 30, 1909, the principal subjects treated in the Quarterly Bulletin were as follows:

Third Quarter of 1908.—"A Suggested Initial Working Plan for the Suppression of Tuberculosis in Michigan," by Rev. Robert E. Macduff, M. D., Jackson; "Factory and Work Shop Tuberculosis," by the Maine State Board of Health; "Tuberculosis, its Restriction and Prevention," by the Michigan Department of Health; "What Women's Clubs' can do Towards the Suppression of Tuberculosis," by Marion A. Spratt; "The A, B, C of Tuberculosis," by the Michigan Department of Health.

Fourth Quarter of 1908.—"What Everybody Ought to Know About Smallpox," by the Florida Board of Health; "Division of Chemistry and Bacteriology," by M. L. Holm, M. D., Lansing; "Preservation of the Teeth of School Children," from the Journal British Dental Association; "Bad Air in Department Stores;" from the Indianapolis News; "Epidemic Cerebro-Spinal Meningitis," from the Glasgow County and Municipal Record; "Practical Suggestions," by Edw. L. Parmenter, Commissioner of Schools, Dickinson county; "Ten Practical Questions with Answers for School Work," by the Michigan Department of Health; "Duty of Railroads in Transportation of Tuberculous Passengers," by John R. Hayes, M. D., Los Angeles, Cal.; "Contamination of Milk with Tubercle Bacilli," by E. F. Pernot, Bacteriologist, Oregon Agricultural College.

First Quarter of 1909.—"Echos from the Sixth International Congress on Tuberculosis," by Thomas S. Ainge, Sanitary Engineer, Michigan Department of Health.

Second Quarter of 1909.—"The Transmission of Disease by Flies," by Daniel B. Jackson, S. B.; "Damages for Sickness Caused by Flies," by the Merchants' Association of New York; "The Guilt of the 'Typhoid Fly' Scientifically Established," by Dr. Alice Hamilton; extract from an address on "Public Health," by President Taft; an address before the School of Trained Nurses, Kalamazoo, June 8, 1909, by Rev. Robert E. Macduff, M. D.; "The Increasing Need for County Health Officers," by Chas. M. Hough, M. D.; "Typhoid Fever," by F. W. Shumway, M. D., Secretary of the Michigan Department of Health; "The War on the House Fly," by Marion A. Spratt, Lansing.

Beginning with October, 1907, a monthly bulletin has been issued and mailed to health officers, newspapers, a selected list of physicians, the superintendent of State charitable, penal and reformatory institutions, members and ex-members of the State Board of Health, and Sanitary Journal Exchanges.

The monthly bulletin is designed, principally, to furnish to health officials and physicians information relative to the prevalence of the several dangerous communicable diseases in the State, but particularly in their immediate vicinity.

By a table in these bulletins, which shows the prevalence of the several diseases in each month of the year and in the average year, the time of the year when any disease may be expected to increase or decrease in prevalence may be noted in advance; and comparisons may be made of the prevalence of any disease in any two or more months in the same year, or between any month in the current year and the corresponding month in the average year.

Special mention is made in the bulletin each month of the disease which is usually most prevalent during the current month; and items of interest, which have an important bearing upon the public health, are inserted as space will permit.

Instructive diagrams, relating principally to the status of the several diseases, occupy the bulk of the front page of each issue of the bulletin.

PLACARDS AND PAMPHLETS RELATIVE TO THE RESUSCITATION OF THE DROWNED.

A copy of the following letter, accompanying the placards "What to do and how to do it," was mailed to health officers and others throughout the State. Pamphlets containing the same rules were mailed to superintendents and principals of schools and to other persons whom this Board considered interested in the same. About 5,000 copies of the placards and 10,000 copies of the pamphlets were distributed during the summer of 1909.

STATE BOARD OF HEALTH, MICHIGAN,

OFFICE OF THE SECRETARY, LANSING.

June 1, 1909.

.............................,
.................................., Mich.:

My Dear Sir—Drowning causes the loss of some 300 lives annually in Michigan. Some of these can be saved if prompt action is taken at the time the accident occurs.

To this end this Department issues instructions—"What to do and how to do it." We are sending to you under separate cover some of these placards. You will do your community a favor by posting these up at such places in your jurisdiction as are indicated on the placard, and at such other places as in your judgment they may be of use.

We shall be glad to supply copies of this placard to any person that can make proper use of them. Thanking you in advance for your interest and help, I remain.

Very truly yours,
(Signed) F. W. SHUMWAY,
Secretary.

HOT WEATHER DIET.

The following neostyle, relative to proper diet in hot weather months, was sent to all daily newspapers, in the State, for publication:

Much trouble and sickness is caused by improper food and drink. Many use the same diet in the summer as in the winter, and wash it down with beer and wine. Nature provides us with a variety of grains, fruits, and vegetables; these, with plenty of cold water to drink, constitute the proper food for hot weather. Eggs and a very limited amount of meat may be used. But meat, meat, meat, three times a day and seven days a week is killing people. Cut out your meat and see how much better you feel at the end of a month.

Bulgaria possesses by far the largest proportion of centenarians of any nation. The food of the Bulgarian peasants is simple, consisting chiefly of coarse brown bread, corn flour, and milk curds, and such fruits as are found there. To this bill-of-fare they owe their length of life and vitality.

The ancient athletes who took part in the Olympic games, in order to excel, willingly placed themselves under strict discipline. They were restricted by their trainers to such food and drink as would develop the greatest power of physical endurance, and which would keep the body in the healthiest possible condition. Coarse heavy bread, dried figs, nuts, soft cheese, and fruits were their chief diet.

If it is necessary for the athlete to observe such care in the selection of food and drink, how much more essential is it for the average business man, the mother in the home, and all who desire real and enduring happiness and who covet a long and useful life.

FLIES POISON FOOD.

The following letter, accompanying placards entitled "Flies Poison Food," was sent to all health officers of the State, who were asked to distribute them to business places mentioned in the letter:

STATE BOARD OF HEALTH, MICHIGAN,

OFFICE OF THE SECRETARY, LANSING.

June 15, 1909

Dear Sir:—

Appreciating the fact that the common house-fly is not generally known to be a carrier of disease to mankind, and believing that every place, hotels, restaurants, bakeries, confectioneries, groceries, etc., where food is prepared for and sold to the public, should exercise extraordinary care to keep flies out and away from the food, I desire to call your attention to the enclosed placards, and to ask that you distribute them in your jurisdiction to such places as are suggested above, for the benefit of the purchasing public.

It is to be hoped that the cooperation of these business places can be obtained, at least so far as putting these placards in their kitchens for the enlightenment and instruction of the help. If, in addition, you can post some of the placards up in public places so that the public may derive benefit from them, kindly do so. More placards can be supplied if you need them.

Thanking you in advance for your effort in this matter, and trusting you may be able to make use of the placards to the best of advantage, I am,

Very truly yours,
(Signed) F. W. SHUMWAY,
Secretary.

WARNING RELATIVE TO SPITTING ON SIDEWALKS.

The following letter, which accompanied placards relative to spitting on sidewalks and other public places, was sent to health officers, superintendents of factories, station agents, and, in fact, to all persons who, in the opinion of this Board, would post the placards in conspicuous places:

STATE BOARD OF HEALTH, MICHIGAN,

OFFICE OF THE SECRETARY, LANSING.

July 3, 1908.

Dear Sirs:

Recognizing the danger that comes from the common habit of promiscuous spitting, the State Department of Health has issued placards giving warning against that filthy habit and stating a few facts about the disease germs contained in spit, and about the spread of those diseases, consumption of the lungs, pneumonia, etc., through spitting.

We believe that you will find these placards to the point and useful; and that it will be no burden to tack up whatever number you may need in your rooms, so that workmen and the public at large may be benefited thereby.

Your courtesy in making use of the supply of these placards already sent you, and any further cooperation you may show for the suppression of tuberculosis, by furnishing spittoons for men to spit in, will be greatly appreciated by this Department, and eventually, if not immediately, by the people as a whole.

Spittoons in public places should contain a little carbolic acid or other disinfectant, and should be cleaned out daily.

We will gladly send a further supply of these warning placards, upon request.

Thanking you in advance for your cooperation in this matter, I beg to remain,

Very truly yours,
(Signed) F. W. SHUMWAY,
Secretary.

SCHOOL WORK.

In compliance with Act No. 146, Laws of 1897, a copy of a special issue of the "Public Health, Michigan," Bulletin, known as the "Teachers' Edition," is mailed to each teacher and superintendent of the public schools in this State at the beginning of each school year. This manual contains the documents issued by this Department, on the restriction and prevention of nine of the dangerous communicable diseases, the document on "Disinfectants, their Relative Value and Uses," and a list of suggestive questions for teachers. In addition to this manual, each teacher and superintendent is supplied with a copy of each regular quarterly issue of the "Public Health, Michigan," Bulletin.

Upon invitation of the officers of the Northern Michigan Teachers' Association, Mr. J. E. McDonald, Deputy Secretary of this Department, attended their meeting held in Traverse City, November 26-28, 1908, and delivered an address on the "Medical Supervision of Public Schools." On invitation of the County School Commissioner of Van Buren county, he also delivered an address at the County Teachers' Association held at South Haven, March 5-6, 1909, the subject of the address being "School Sanitation."

ADVICE TO LOCAL BOARDS OF HEALTH, BOARDS OF EDUCATION, ETC.

During the fiscal year 1909, upon invitation, the Secretary, and in a number of instances, the Sanitary Engineer, of this Department made visits to a number of localities for the purpose of conferring with the local authorities upon matters pertaining to the public health. These visits have been productive of much good, and have been greatly appreciated by the citizens of the localities visited; but, by reason of the lack of an appropriation for this purpose, the sending of a representative from this Department to a locality to make an investigation has not, in the past, always been an easy matter, and the locality has often had to bear the expenses incurred in so doing. This difficulty has been overcome by Act No. 293, Laws of 1909, which is printed on subsequent pages of Part I of this report and which became effective on June 2, 1909.

LOCALITIES VISITED BY THE SECRETARY OF THIS BOARD DURING THE FISCAL YEAR ENDING JUNE 30, 1909.

In addition to his attendance at the regular and special meetings of the Board and at examinations of embalmers, which were held outside of the city of Lansing, the Secretary of this Board made visits to the undermentioned localities for the purposes named:

EATON RAPIDS, JULY 28, 1908.—To investigate an outbreak of typhoid fever.*

HONOR VILLAGE AND PLATTE AND HOMESTEAD TOWNSHIPS, BENZIE COUNTY, AUGUST 10 AND 11, 1908.—To investigate outbreaks of smallpox.

GRAND RAPIDS, OCTOBER 14 AND 15, 1908.—To make investigation relative to a protest against the granting of embalmers licenses to two candidates.

EVART, MARCH 5, 1909.—To deliver an address before the Osceola County Teachers' Institute Association and the physicians of the village.

PALMYRA AND LENAWEE JUNCTION, LENAWEE COUNTY, MARCH 16, 29 and 30, 1909.—To make investigation relative to outbreaks of typhoid fever.†

GRAND RAPIDS, APRIL 1, 1909.—To make investigation relative to the disposal of night soil.

MANCELONA AND ANTRIM, APRIL 2 AND 3, 1909.—To make investigation of health conditions.

ADRIAN, APRIL 12, 1909.—To make investigation relative to an outbreak of scarlet fever at the State Industrial School for Girls.†

CALEDONIA, APRIL 23, 1909.—To make investigation relative to an outbreak of scarlet fever.†

HOLLAND, MAY 4, 1909.—To make investigation relative to an outbreak of typhoid fever.†

ST. CLAIR, MAY 13, 1909.—To deliver an address before the Municipal Improvement Club.

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*A brief report of this visit may be found in Part II of this report.

†Reports of these visits will be printed in Part II of the Annual Report for 1910.

ADRIAN, MAY 27 AND 28, 1909.—To make further investigation relative to the outbreak of scarlet fever at the State Industrial School for Girls and to raise the quarantine.†

PETOSKEY, JUNE 14 AND 15, 1909.—To make investigation relative to the ice supply.

LOCALITIES VISITED BY THE SANITARY ENGINEER, AND OTHER WORK IN THE DIVISION OF SANITARY ENGINEERING, DURING THE FISCAL YEAR, 1909.

Much of the work in this Division is carried on by correspondence and, occasionally, by telephone, detailed statements of which cannot be given in this report for lack of space.

One of the important lines of work in this Division is the examination of plans for the heating, ventilation and sewerage of the buildings at State institutions, particulars and reports of which are printed in these annual reports from year to year under the heading "Examination of Plans for State Buildings."

Extracts from reports upon the localities visited by the Sanitary Engineer during the fiscal year 1909 follows:

REPORT ON THE PROPOSED FILTRATION PLANT AT ESCANABA.

On July 10, 1908, plans for a proposed filtration plant at Escanaba were received by this Board for consideration and approval. Following is the report of the same:

Inasmuch as the successful working of the proposed plant will depend upon the proper supervision of the same, the plans are approved subject to the direct supervision of the plant, at all times, by the local board of health.

It is recommended that provision be made for frequent chemical and bacteriological analyses of the water, as it is only by this means that the proper working, or otherwise, of the plant can be determined.

REPORT OF AN INVESTIGATION RELATIVE TO THE DISPOSAL OF SEWAGE AND EXCRETA AT LAKE ODESSA.

On request of Dr. F. L. Morse, health officer of Lake Odessa Village, on October 22, 1908, this Board sent its sanitary engineer to confer with the local health authorities relative to the disposition of the sewage and excreta in that village. On the completion of the investigation the following report was submitted:

It appears that the present main sewer—which is tiled where it passes under the village and is an open ditch from the business portion of the village to the lake—was originally intended for a county drain only. The tiled portion of the sewer receives practically all of the sewage from buildings in the business portion of the village, including the overflow from a considerable number of cesspools. The open ditch receives the sewage from the tile pipes before-mentioned and also the wastes from the condensed milk factory, and discharges into the lake, from which ice is cut and shipped to other localities and on the banks of which a very attractive resort is being built up. At the lower end of the ditch, the sewage flows through a low piece of land, which has been extensively trampled by cattle in their passage to and from the ditch for water (sewage), and the condition of the land at this point is very bad. Throughout its entire length the ditch is very foul and is a constant menace to the health of the inhabitants, particularly in the case of those in the schoolhouse and other buildings in its immediate vicinity.

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†Reports of these visits will be printed in Part II of the Annual Report for 1910.

At the time of my visit, two cases of typhoid fever existed in a house near to the lower end of the ditch, and the local health officer, Dr. F. L. Morse, very properly, placed the blame for these cases upon the ditch. It appears that the patients (two boys) had played on the banks of the ditch and fished walnuts out of the sewage, into which they had fallen from an overhanging tree, and the infection was probably transferred from the walnuts to their hands and from thence to their mouths. This belief is strengthened by the fact that recent analyses, by this Department, of samples of water from the well at the house where the typhoid fever cases occurred and from the village water supply showed those samples to be above suspicion, and by the further fact that an analysis of a sample of liquid from the ditch showed it to be very filthy and of the most dangerous character.

There is but one logical method of dealing with the sewage question in this village, viz., the construction of a system of sanitary sewers, for the reception of *all* of the sewage and waste water from buildings, and the purification of the sewage before it enters the lake. The design of such a plant should be entrusted to some engineer who has had considerable experience in this line of work. As soon as possible after the installation of the sewers, every cesspool should be abolished, and every common privy of buildings not reached by the sewers should be converted into a sanitary dry earth closet.

I would call special attention to the present dangerous practice of erecting common privies in connection with the cottages near to the lake and of sinking shallow wells, for water supplies, in their immediate vicinity. The cottages should be supplied with water from the village water mains, and the privies should be converted into sanitary dry earth closets. These matters can be regulated by the local board of health under the powers conferred upon them by Sections 4412, 4413 and 4466 of the Compiled Laws of 1897.

REPORT ON THE SEWERAGE SYSTEM OF THE CITY OF MONROE.

On Nov. 23, 1908, a communication was received from the health officer of the city of Monroe, requesting the State Board of Health to make an inspection of the sewage system of that city. In accordance with the request, on November 27, 1908, the sanitary engineer visited the city of Monroe and the following report, relative thereto, was submitted:

The present sewers do not reach a considerable portion of the city; some of them are reported as being in bad condition, necessitating frequent removal of stoppages at considerable cost; and the outlets of all are improperly located and the source of many complaints from the citizens.

A majority of the sewers discharge directly into the river, and the condition of the bed of the river near to and for a considerable distance below the outfalls is very bad and cannot fail to be a constant source of annoyance and of danger to passers-by and to those residing in the immediate vicinity of such outfalls, particularly when the water in the river is low.

One sewer discharges into a bayou, just east of the intersection of the Shore Line R. R. and Front Street, and the condition of the bayou at this point is very filthy and offensive, and a menace to health.

Still another sewer discharges into an open ditch southeast of the intersection of Fourth Street and M. C. R. R. and in close proximity to a number of houses. The ditch is very foul and offensive, and I was informed that in the spring of the year, and at such times as the rainfall may be heavy, accumulated sewage is washed out of this sewer and ditch in such quantities as to pollute the yards and gardens of houses in the vicinity of the ditch.

There is but one logical method of dealing with the question under consideration, viz., the construction of a trunk sewer to convey the entire sewage of the city to a point in the river near the southeasterly limits of the city; the reconstruction of such portions of the sewers as may be defective or improperly constructed; and the extension of the sewerage system to every part of the city not already sewered.

A plan which contemplates the construction of a trunk sewer and the extension of the sewerage system to practically every part of the city is on file in the office of the city clerk, and the general layout of the proposed sewers, as shown on this plan, seem to be just what is needed for the city.

For the purpose of making a sanitary disposal of the sewage of the city, and removing the possibility of contingencies which might arise in the future, it is recommended that, in the plans for a trunk sewer, provision be made for a purification plant, to be constructed at the outlet of the sewer as soon as practicable after the trunk sewer and the proposed sewer extensions are completed.

By reason of the periodical flooding of some of the cellars in the city which have sewer connection, I would suggest that house owners hermetically seal all such openings which are not actually necessary. In the case of those cellars for which sewer connections are considered necessary, suitable back-water valves in the house sewers would prevent much annoyance and the fouling of the cellars.

I was informed that ice is cut during each winter from the river just below the city. Ice from this source would be in danger of serious contamination and, possibly, infection, and the practice should be discontinued for all time.

REPORT ON A PROPOSED ADDITIONAL WATER SUPPLY FOR BENTON HARBOR.

The local authorities of the city of Benton Harbor requested this Board to send a representative to confer with them relative to the source of an additional water supply for their city. In accordance with their request, on December 28, 1908, the sanitary engineer visited Benton Harbor and the following is the report made of that visit:

You are already familiar with the fact that a number of wells have recently been sunk by the city and with the results of the analyses, by this Department, of samples of water from these wells, and I would simply add that the opinion arrived at prior to my visit, relative to the unsuitability of these wells as sources of supply for domestic purposes, was fully justified by an inspection of the watershed from which the wells would derive a large portion of their supplies, and by the results of the recent analysis of another sample of water from well No. 3.

It was suggested to the city authorities that one of the wells under consideration be continued down to a point below the underlying bed of clay for the purpose of ascertaining whether water can be obtained in sufficient quantity from the strata between the clay and shale. From an interview with the State Geologist, it is doubtful, however, if a plentiful supply of water can be obtained from this formation, and if the test well should not give satisfactory results, I would strongly recommend the serious consideration, by the city authorities, of a water supply from the lake, *the intake to be at a sufficient distance from the shore to insure a safe supply.* The adoption of this plan would settle the question of water supply for all time, and could not fail to have a very beneficial and lasting benefit upon the health of the people generally.

REPORT ON THE HEATING AND VENTILATION PLANT OF THE SCHOOLHOUSE AT PERRY.

In compliance with a request from the school board of the village of Perry for an examination and test of the heating and ventilation plant recently installed in their schoolhouse this Board sent its sanitary engineer to that village, January 6, 1909, to make the examination, and the following report was made:

The day was very cold, a thermometer placed outside the schoolhouse registering seven degrees above zero and a strong northwest wind prevailing throughout the day,—ideal weather for testing the capabilities of such a plant.

With the exception of the Intermediate room, all the rooms were receiving the necessary changes of air, and in the High School, Second Primary, Grammar and Recitation rooms the supply of fresh air was in excess of the usual minimum of thirty cubic feet per minute for each pupil.

With the exception of the First and Second Primary rooms, none of the rooms could be heated to seventy degrees when the plant was being operated at its full capacity, and there was a considerable difference between the temperatures of the air entering the various rooms, notably in the case of the Recitation room.

There was considerable leakage of cold air, through badly fitting windows, into rooms having westerly and northerly exposure, and a considerable leakage of warm air from the High School room through an opening between the upper sash and frame of one of the windows on the south side.

The fresh air flue and register of the Intermediate room is badly located, being next to an outside wall on the west side of the room. This flue should be removed to some point on the south wall of the room between the two warm-air flues which supply the Grammar room above.

The vent flue of the Grammar room is not well located, being next to the outside west wall. When the fan is working, however, there is a sufficient draft in this flue, as shown by the large amount of air which was passing through the room at the time of the test.

It is recommended that the dampers in the warm-air ducts in the basement, together with the speed of the fan, be adjusted by the heating contractor so that each room shall receive its proper amount of fresh air, and no more, and that the person in charge of the heating apparatus be well instructed by the heating contractor relative to the proper adjustment of every part of the plant.

The following is a detailed summary of my findings in regard to the temperature of and the changes of air in the several rooms. It should be stated, however, that the temperatures given in the summary are the highest observed during the day and that the temperatures of the rooms in the morning were much lower than in the afternoon.

SUMMARY.

First Primary Room.

Temperature in warmest part of room = 70°.
Temperature of inflowing air = 98°.
Volume of inflowing air = 1,200 cubic feet per minute.
Volume of air required = 1,200 cubic feet per minute.

Second Primary Room.

Temperature in warmest part of room = 66°.
Temperature of inflowing air = 98°.
Volume of inflowing air = 1,347 cubic feet per minute.
Volume of air required = 960 cubic feet per minute.

Intermediate Room.

Temperature in warmest part of room = 66°.
Temperature of inflowing air = 85°.
Volume of inflowing air = 976 cubic feet per minute.
Volume of air required = 1,320 cubic feet per minute.

Grammar Room.

Temperature in warmest part of room = 67°.
Temperature of inflowing air at register nearest to west wall = 90°.
Temperature of inflowing air at register nearest to east wall = 106°.
Volume of inflowing air = 2,479 cubic feet per minute.
Volume of air required = 930 cubic feet per minute.

High School Room.

Temperature in warmest part of room = 65°.
Temperature of inflowing air = 98°.
Volume of inflowing air = 1,466 cubic feet per minute.
Volume of air required = 1,200 cubic feet per minute.

Recitation Room.

Temperature in warmest part of room = 60°.
Temperature of inflowing air = 68°.
Temperature of air at the base of warm-air flue of this room = 83°.
Volume of inflowing air = 1,486 cubic feet per minute.
Volume of air required = 30 cubic feet per minute for each occupant.

(The number of occupants in this room varies from time to time, and the damper in the fresh-air duct leading to the room should be set to afford a sufficient amount of air for the maximum number of persons who will occupy the room at any one time.)

The temperature of air in the warmest part of the plenum chamber was 114°, and in the flue at the east side of the chamber 83°.

REPORT RELATIVE TO A COUNTY DITCH IN UNADILLA TOWNSHIP, LIVINGSTON COUNTY.

Upon request to this Board by the County Drain Commissioner of Livingston county that a representative of this Department be sent to make an inspection, as far as public health was concerned, of a county ditch in Unadilla township, Livingston county, on March 16, 1909, the sanitary engineer made such inspection, and submitted the following report:

In company with the County Drain Commissioners of Livingston and Washtenaw counties, a jury of Livingston county, the attorneys representing both sides of the question, and a number of persons living along the line of the ditch, I made an inspection of a county drain in Unadilla township, Livingston county, for the purpose of determining the necessity, or otherwise, from a public health standpoint, of the deepening and widening of the ditch.

On March 17, I gave testimony before the jury in question that, inasmuch as a very large area of swampy land would be drained by the proposed enlargement of the ditch, the work was necessary for the public health.

REPORT RELATIVE TO THE INSPECTION OF THREE SCHOOL BUILDINGS AT WYANDOTTE.

The school authorities of Wyandotte requested this Board to have the schoolhouses of that city inspected as to the ventilation, etc., and in accordance with their request, on March 23, 1909, the sanitary engineer visited that city and submitted the following report relative to the same:

McKinley School.

The local vents of the range closets are connected with a main vertical vent shaft on the outside of the building and, as would be expected, there was little or no draft in the same. In the very cold weather, there would probably be a constant down draft in this shaft, and it should be placed on an inside wall and extended to the highest part of the roof at the earliest convenience.

The fresh-air duct from the fan to the furnace is very leaky and this is probably the reason why the temperature of the Kindergarten room cannot be kept up to the proper degree. There should be a tight cover over every portion of this duct, not only to prevent leakage of air but to prevent the entrance to the duct of dust at such times as the fan may not be in motion.

I was informed by the person in charge of the heating apparatus that the fan is shut down as soon as the Kindergarten is dismissed, which is about one hour before the last of the higher grades is dismissed. This is a bad practice, because as soon as the fan stops the ventilation stops. The fan should be kept running until the close of the school sessions.

The surface water of the toilet rooms is removed by Bell traps, one of which was filthy. It is probable there are other traps beneath the Bell traps or sewer air would be detected passing into the building at these points. The Bell trap is antiquated and an abomination, because it is no longer a trap when the cover is removed or the very small amount of water in the trap has dried up. Water does not flow through them readily when the floors are washed and the cover must then be raised, thus destroying the seal. When the cover is raised it is usually left off for long periods of time and is easily broken. If, as is usual, another trap is placed beneath the Bell trap, the latter will effectually prevent the cleansing of the lower trap. Proper floor traps should be substituted for the Bell traps as soon as possible.

The range closets are of iron, and were apparently painted when new, but they now show signs of corrosion. They were fairly clean at the time of my visit, due evidently to a recent vigorous scrubbing. At the earliest opportunity, they should be thoroughly scrubbed and given at least two coats of suitable paint to prevent further corrosion and to facilitate cleansing. The chief objection to this class of closet is the fact that, sooner or later, even in the case of the best enameled fixtures, the trough will become rough and filth will cling to the sides, causing offensive odors, and it is only by the exercise of constant vigilance and muscle that this condition can be prevented. Again, if the flushing apparatus should be even temporarily out of order, or the flushes of water too far apart, filth would be very liable to accumulate in the trough, or to become dry on the sides above the water line, and remain there until removed by vigorous scrubbing. Apart from a sanitary consideration, this type of fixture is a water waster, because the flushing must be frequent and in quantity sufficient to remove the maximum amount of filth whether much or little use is made of the fixture. Placed in comparison with a range of substantial siphon wash down closets, with seat action flush, the trough closet is very inferior, evidence of which may be found in the fact that, as a rule, modern school buildings are equipped with individual closets and in the further fact that trough closets, and others of this type, are prohibited by the plumbing codes of the leading cities of this country.

The heating and ventilation of this building is accomplished by means of a furnace and fan, and the plant will probably effect the necessary changes of air in the rooms if the leaks in the air duct between the fan and furnace are stopped and the plant is properly operated. In this connection it should be stated that furnace heat is generally conceded to be inferior to steam heat for school buildings, particularly where the air is not forced over the furnaces by a fan.

Garfield School.

What has been said relative to the range closets and to the comparative inferiority of the method of heating in the McKinley School will apply with equal force to the Garfield School.

With respect to the ventilation of this building about which there has been considerable controversy, from my observation, and from the tests made by Messrs. Williamson, Allen, Brown, Daley and myself, I am satisfied that when the plant is properly operated it will furnish a sufficient amount of fresh air for the pupils in every room, but the temperature will not be easy to control by the means of regulation provided. That the proper ventilation of the building will depend very largely upon the care which is given to the operation of the various dampers is evidenced by the fact that, in tests made by Prof. Daley, the volume of fresh air entering each room was very much greater after the janitor had been informed that such tests were being made.

I do not see how the quality of the air in the schoolrooms could be improved without having recourse to elaborate and somewhat uncertain apparatus for washing and moistening the air.

High School.

There is a waste pipe and trap from which the wash basin has been removed in the boys' toilet room in the basement, and sewer air is passing into the room through this pipe in considerable quantity. The trap should be securely and hermetically sealed as soon as possible.

The floors of the toilet rooms of this building are drained by Bell traps, and what was said about these traps in connection with the McKinley School will apply here with equal force.

The range closets in this building were found to be in much better condition and the local ventilation much better than in the other two buildings.

A panel was broken out of the door between the fresh air-room and the rest of the basement and large quantities of air from an undesirable source was found to be entering the air supply. The panel should be replaced as soon as possible.

REPORT OF THE WATER SUPPLY OF MONROE.

The local health officials of Monroe requested this Board to send a representative to that city to confer with them in regard to their public water supply and, in accordance with their request, on May 28, 1909, the sanitary engineer went to Monroe and the result of the investigation is embodied in the following report:

I visited that city and talked over the water situation with the health officer, and, on the following day, in company with several of the city officials, officers of the Monroe Water Company, and representatives of the local newspapers, I made a careful inspection of the water works and of Lake Erie in the vicinity of the intake.

As you are aware, analyses, by this Department, of samples of water taken from the lake in the vicinity of the intake and from faucets in the city in August, 1908, and in the latter part of May of this year showed the water to be seriously contaminated. As there was a possibility that some of these samples may not have been obtained and shipped to the laboratory in the manner best suited to make them representative of the general water supply, at my request, on May 31, three samples of water were obtained by the health officer and submitted to this Department for analyses, the results of which are contained in the report of the State Bacteriologist, which is made a part of this report and confirms the previous conclusions of this Department as to the dangerous character of the water.

It would seem as though the intake was located in as good a position as could be found in that part of the lake, but this could not be fully determined without the aid of analyses of samples of water taken from the lake at several points further out than the intake. The extension of the intake to a greater distance from the shore would bring it nearer to the channel through which flows the sewage of the cities of Port Huron, St. Clair, Marine City, Detroit and Wyandotte, and, for this reason, the contamination of the lake would be expected to show an increase in proportion as the intake might be extended outward from the shore. Notwithstanding the great distance between the intake and the main channel through which the sewage from the Detroit river flows, during the prevalence of high easterly winds, considerable contaminated water from the channel is probably forced over to that part of the lake in which the intake is located.

Other probable sources of contamination of the lake water in the vicinity of the intake are the waters from Sandy Creek and Stony Creek, and, possibly, Swan Creek and Huron River.

At my request, hydrants in four different parts of the city were opened for the purpose of ascertaining the condition of the water mains. One of these, located opposite the Boehme and Rauch Co. main factory, discharged very muddy water for the space of fifteen minutes; the other three discharged comparatively clear water within a few seconds from the time the water was turned on.

It is suggested that the investigation into the condition of the lake water be continued by means of analyses of samples, taken in a systematic manner, from different parts of the lake; and that, pending the extension of the intake to a safe point—if such can be found—or the installation of a water purification plant,—which is the only way in which an absolutely safe water can be obtained at all times—the people of the city be urged to continue the boiling of the water used for drinking or domestic purposes. From the results of the analysis of sample No. 3, contained in the attached report of the State Bacteriologist, it is apparent that domestic filtration cannot be relied upon to purify the water of this city, and the people should be so informed.

It is also recommended that the water mains be frequently and systematically flushed, by means of the fire hydrants, particularly during the turbid condition of the water.

It is further recommended that the practice of discharging the contents of the emergency reservoir at the pumping station into the water mains, after the danger of stoppage of the intake by anchor ice has passed, be discontinued and that the water be discharged into the drain which removes the waste water from the boiler house.

REPORT UPON CERTAIN INSANITARY CONDITIONS IN FOWLER VILLAGE.

Upon request of the village president of Fowler village, on June 15, 1909, this Board sent the sanitary engineer to investigate certain insanitary conditions in existence at that place, and the following report was made in regard to the same:

There are no sewers in the village, the greasy and soapy water from the sinks being discharged into open ditches, usually in the rear of the lots, from whence it passes into the street ditches and, finally, into two main ditches, located east and west of the village. The condition of most of these ditches is such that the foul water cannot pass away readily, and it stagnates or leaches into the soil in the immediate vicinity of dwellings and places of business, causing a very unhealthful condition. To add to this dangerous condition, during the times of heavy rains or the thawing of snow, the surface water has access to very many, if not all, of the privies, and these overflow or leach into the ditches beforementioned. Special mention is made of the following ditches and other places which are in a very disgusting condition and call for immediate attention on the part of the local board of health:

A ditch at the rear of the Fowler House, extending from the wooden trough to the street ditch on Wayne Street. There is evidence of the overflow of filth from the privies of the hotel into this ditch.

A ditch on the east side of Main Street, particularly in the rear of the postoffice and adjacent buildings. A number of privy pits overflow or leach into this ditch, and, in the case of the privy at the rear of the Schneider meat market, the excreta may fall directly into a branch of the ditch under consideration and remain there until there is a sufficient flow of water to carry it into the main ditch, which would probably not be very often.

A ditch at the rear of the residences of Mr. Sturgis and Mrs. Schneider, on the west side of Main Street (Lots 1 and 2 of Block 6 of the Re-subdivision), into which some sink water and the roof water from two barns flows. During heavy rains, water overflows this ditch and washes filth out of privies and on to the lots, in one place to within a very short distance of the rear of the residence of Mr. Sturgis.

A ditch in the rear of the residence of Mr. Widgeon (Lot 12 of Block 6 of the Re-subdivision), into which the filth from a barnyard on the premises flows and in which it stagnates.

An accumulation of filthy water under the barn at the rear of the residence of Wm. H. Youngs, evidently due to the filling in of a ditch which used to carry this water into the ditch from the Fowler House.

The barnyard of the hotel, abutting on Wayne Street, where two pigs were wallowing in the filth at the time of my visit. They also have free access to the stagnant filth in the ditch from the hotel sinks.

The ditch which removes the wastes from the Fowler Butter Factory. There does not appear to be any movement of the liquid, or semi-liquid, mass in the ditch and a portion of the waste water, etc., from the factory backs up and flows toward the south and within a very short distance of residences on Second Street. Even though the main portion of the accumulated filth in the ditch is quite a little distance east of the main portion of the village, it would seem inconceivable that the residents of buildings west and south of the ditch can escape annoyance and danger from the noxious odors from the ditch when the wind prevails from the west or north, especially in the warm weather.

It is recommended that all the ditches be properly cleaned out, and that glazed earthenware drains, with cemented joints, be provided for the conveyance of the waste water from the dwellings, stores, etc., to the main ditches east and west of the village; but the filth from privies, or from any water closets which might be installed, should not be allowed to pass into these ditches without previous purification.

It is also recommended that, as soon as practicable, each privy in the village be converted into a dry earth closet, or the privies be provided with water-tight receptacles, extended above the surface of the ground to prevent surface water from entering the same. These receptacles should be emptied sufficiently often to prevent them overflowing or otherwise becoming a nuisance and a danger to health.

It is further recommended that the keeping of pigs within the village be not allowed unless they are provided with proper quarters and kept in a cleanly condition.

It is further recommended that the waste water from the butter factory be purified, by a septic tank and filtration bed, before it is discharged into the ditch.

The foregoing matters are entirely within the jurisdiction of the local board of health; and they should make and publish rules and regulations governing the disposal of waste and excreta in the village and see that the rules and regulations are lived up to.

LABORATORY REPORT FOR THE FISCAL YEAR ENDING JUNE 30, 1909.

Dr. F. W. Shumway, Secretary State Board of Health:

Dear Doctor—In submitting the report of the work of the laboratory for the year ending June 30, 1909, we have included all examinations since the laboratory was equipped in February, 1908. The examinations made from February to June, 1908, inclusive, properly belong to the annual report of 1908, but owing to the fact that during this period the laboratory work was in its infancy and the number of examinations was few, the samples as a rule having been received in a very irregular manner, these examinations were not given separate space in the annual report of that year.

During the past year, several important special investigations have been undertaken, chief among which should be mentioned the investigation of the sanitary quality of the water in St. Clair River. A separate report of this investigation has been published by Dr. J. W. Inches of St. Clair, Michigan.

The work of the laboratory has progressed steadily and has been, in a general way, very satisfactory. Special credit is due Miss Mildred Beals for careful and systematic work in the office, as well as valuable assistance in carrying on the general work in the laboratory.

SUMMARY OF EXAMINATIONS, YEAR ENDING JUNE 30, 1909.

Total number of examinations	1,690
Chemical and Bacteriological examinations of water for potability	352
Sputa and other discharges examined for tubercle bacilli	442
Throat Swabs examined for diphtheria bacilli	298
Blood samples examined for Widal's reaction	97
Chemical and Microscopical examinations of urine	95
Bacteriological examinations of milk	44
Mineral examinations of water	33
Pathological examinations of Feces	12
Pathological examinations of tumors	25
Disinfectants examined	72
Pathological examinations of stomach contents	8
Toxicological examinations	12
Miscellaneous blood examinations	14
Examinations for malaria	3
Post-mortem examinations	4
Examinations for rabies	3
Examinations of temperance beer	8
Examinations of grape juice	5
Examinations of ice	1
Examinations for venereal disease	86
Other miscellaneous examinations	76

SUMMARY OF EXAMINATIONS ARRANGED BY MONTHS.

Month.	Waters.		Sputa. Tuberculosis.		Throat Swabs. Diphtheria.		Blood. Widal's Reaction.		Miscellaneous.	Total.
	Safe.	Unsafe.	Pos.	Neg.	Pos.	Neg.	Pos.	Neg.		
February, 1908	5	8	3	4	1	4	0	3	10	38
March, 1908	10	4	9	8	0	0	0	2	9	42
April, 1908	4	12	7	18	0	0	1	3	21	66
May, 1908	7	4	11	23	0	1	0	0	11	57
June, 1908	5	8	8	17	0	5	2	0	20	65
July, 1908	13	20	6	12	0	0	1	1	14	67
August, 1908	12	18	5	18	3	3	6	4	57	126
September, 1908	13	21	4	14	15	7	4	8	22	108
October, 1908	15	28	8	17	28	29	5	13	16	159
November, 1908	3	7	4	15	14	24	1	1	24	93
December, 1908	5	11	8	13	4	13	1	1	23	79
January, 1909	4	2	6	13	6	8	2	0	76	117
February, 1909	5	7	11	21	14	17	1	7	36	119
March, 1909	11	9	6	25	17	18	1	2	39	128
April, 1909	9	18	6	27	0	13	3	3	35	114
May, 1909	11	12	10	33	4	5	2	1	38	116
June, 1909	8	23	17	35	27	18	11	7	60	206
Total	140	212	129	313	133	165	41	56	511	1,690

POTABLE WATER.

One of the most important functions of a Board of Health Laboratory is, without doubt, the investigation of public supplies of water and ice. While the danger associated with the use of ice cut from contaminated sources has undoubtedly been overestimated in the past, the use of impure ice for other than cooling purposes is not without serious objection and we cannot question the fact that certain diseases may occasionally be traced thereto.

The relation of contaminated water supply to the mortality from typhoid fever is quite generally understood and seems to be fairly well appreciated even by the laity. The relation of contaminated water supplies to general mortality, however, does not seem to be so well recognized. Several noted authorities have recently shown that only about one-third of the deaths caused by impure water supplies are indicated by the mortality from typhoid fever and that for every death from typhoid fever prevented by improving the water supplies two other lives will be saved.

During the past year we have had occasion to investigate several outbreaks of so-called "Winter Cholera." These outbreaks have generally occurred at the time of a rapid thaw or heavy rain. They have lasted only for a few days and have been usually followed after the proper incubation period by a number of cases of typhoid fever.

In all of such outbreaks investigated we have found that there had been either a sudden contamination of a previously pure water supply or a marked increase in the amount of contamination of a previously slightly contaminated water.

The name "Winter Cholera" we believe to be misleading because these outbreaks are not limited to the winter months, but may occur in any season. We would suggest that the name Sewage Toxemia would be more appropriate and probably expresses the correct etiologic factor.

We take pleasure in announcing that in all of the localities where such outbreaks have been due to contamination of deep well waters the local authorities have acted promptly. The sources of contamination have been located and the proper remedies applied. In localities where the public water supplies come from surface sources, however, the local attitude has sometimes been somewhat different. The installation of a filter plant or the extension of an intake to safe points requires a considerable expenditure of money and improvements under such conditions always meet with considerable local opposition. The pollution of our lakes and rivers is increasing from year to year and many of the localities which obtained relatively pure drinking water from surface sources years ago find water from the same source at the present time highly contaminated.

SUMMARY OF WATER EXAMINATIONS FOR THE YEAR ENDING JUNE 30, 1909.

Location.	Total examined.	Safe.	Unsafe.
Almont	1	0	1
Athens	1	1	0
Benton Harbor	19	3	16
Bay City	1	0	1
Berrien Springs	2	1	1
Bennington	1	1	0
Boyne Falls	1	1	0
Bellaire	2	0	2
Bellevue	2	1	1
Buckley	2	1	1
Cassopolis	2	2	0
Cedar Springs	3	3	0
Challenge Mine	1	0	1
Concord	1	0	1
Caro	1	0	1
Chatham	1	0	1
Chicago (Lake Michigan)	3	1	2
Cheboygan	1	0	1
Dawson	2	1	1
Delton	1	1	0
Durand	1	0	1
Eaton Rapids	6	4	2
Freeland	1	0	1
Flint	2	1	1
Grandville	3	1	2
Germfask	2	1	1
Greenville	1	1	0
Gladwin	2	1	1
Grand Rapids	1	0	1
Grand Ledge	1	0	1
Honor	3	1	2
Hudson	1	0	1

Location.	Total examined.	Safe.	Unsafe.
Hubbell	5	3	2
Holland	6	5	1
Iron River	1	0	1
Judge	1	0	1
Jackson	1	1	0
Kalamazoo	8	7	1
Lake Odessa	3	2	1
Lapeer	3	1	2
Ludington	1	0	1
Lansing	47	28	19
Lacota	1	1	0
Lowell	1	0	1
Mattawan	1	0	1
Monroe	8	0	8
Mason	1	0	1
Mancelona	1	0	1
Manistique	7	3	4
Marquette	6	5	1
Marshall	1	1	0
Mendon	4	3	1
New Baltimore	1	0	1
Northfield	1	0	1
Newberry	4	3	1
Niles	6	0	6
Ortonville	4	4	0
Olivet	2	1	1
Owosso	3	1	2
Paw Paw	3	3	0
Petoskey	1	1	0
Palatka	1	1	0
Pontiac	1	0	1
Pentwater	3	0	3
Portland	1	1	0
Pigeon	1	0	1
Palmyra	15	1	14
Rockland	4	0	4
Smiths Creek	1	0	1
Sturgis	2	0	2
St. Louis	2	2	0
Saline	1	0	1
Swartz Creek	1	0	1
St. Clair City	2	1	1
St. Clair River	67	18	49
St. Johns	11	7	4
South Haven	1	0	1
Saranac	1	1	0
Thompsonville	1	1	0
Union City	4	2	2
Unionville	1	1	0
Vandalia	2	1	1
Wyandotte	17	1	16
Zeeland	4	1	3

TUBERCULOSIS.

This laboratory supplies special mailing cases to local health officers for distribution to physicians having cases of suspected tuberculosis, and physicians submitting material for examination are urged to use these cases whenever possible. Whenever such cases are not at hand, the infected material must be sent by express. No tubercular discharges will be examined at this laboratory when shipped in violation of the U. S. postal regulations. The necessity for following in detail the directions accompanying our mailing cases cannot be too strongly emphasized. A large number of sputa received during the past year have consisted essentially of saliva, and no doubt negative results have occasionally been reported in positive cases because the material was improperly collected.

Tubercle bacilli can usually be readily demonstrated in sputa containing them, and in properly collected material negative results from positive cases should be extremely rare. In examining tubercular material from other parts of the body, the demonstration of tubercle bacilli is usually more difficult.

Spinal fluid should be collected in a sterile bottle and sent to the laboratory with the least possible delay.

Urine and feces should be mixed with equal volume of 5% carbolic acid in water, which will prevent decomposition during shipment.

Other discharges may be collected and shipped in the regular sputum containers.

Tubercular tissues should be placed at once in 70% alcohol, in which condition they will keep indefinitely.

SUMMARY OF SPUTA EXAMINATIONS.

Total number of sputa examined for tubercle bacilli		442
Total number positive	129	
Total number negative	313	

Other organisms associated with tubercle bacilli in sputa:

Streptococci, 29.
Staphylococci, 5.
Pneumococci, 46.
Contamination, 5.
No other organisms present, 44.

Other organisms present where tubercle bacilli were absent:

Streptococci, 52.
Staphylococci, 17.
Pneumococci, 146.
B. Influenza, 27.
M. Catarrhalis, 4.
Contamination, 17.
No other organisms identified, 50.

DIPHTHERIA.

During the year, 298 throat swabs were submitted to the laboratory for examination. Of these, 239 were for diagnosis and 58 for release from quarantine. This leads us to again call attention to the importance of controlling quarantine or isolation by bacterial examination. It has been shown by numerous authorities that the time limit in diphtheria release is unreliable and that Klebs-Loeffler bacilli may persist anywhere from a few days after the disappearance of the membrane to several months. The relative frequence of healthy diphtheria carriers should also be considered prior to the release from quarantine. Isolation or quarantine is obviously for public protection, and since we are dealing with a specific infection the danger to the community is clearly from the offending bacteria rather than the disease itself. Healthy diptheria carriers are more dangerous to the community than the sick individual because the latter is usually confined to his bed or at least to the house, while the healthy carrier is more likely to roam at large and mingle with other individuals of the community. It is not uncommon where diphtheria antitoxin has been administered on the first day of the disease for a patient to have recovered and be apparently normal on the second day. Such cases often insist on immediate release and may even question the correctness of the diagnosis. In these instances it should be remembered that while antitoxin exerts a favorable influence on the disease, the treatment does not materially influence the diphtheria bacilli, and the organisms may persist in the throat as long as in the severer cases.

SUMMARY OF THROAT SWABS EXAMINED, YEAR ENDING JUNE 30, 1909.

Total number of throat swabs examined		298
Total number of throat swabs showing B. Diphtheria	133	
Total number of throat swabs showing absence of B. Diphtheria	165	
Total number of throat swabs examined for release from quarantine		59
Total showing B. Diphtheria present	24	
Total showing B. Diphtheria absent	35	
Total number of throat swabs examined for diagnosis		239
Total showing B. Diphtheria present	109	
Total showing B. Diphtheria absent	130	
Total number of swabs examined from cases where previous diagnosis of diphtheria had been made from clinical findings		87
Total showing B. Diphtheria present	60	
Total showing B. Diphtheria absent	27	
Per cent of cases of clinical diphtheria not caused by B. Diphtheria		31
Total number of swabs examined where clinical diagnosis was questionable		92
Total showing B. Diphtheria present	34	
Total showing B. Diphtheria absent	58	
Per cent of questionable cases found to be diphtheria		37
Total number of swabs examined from case where previous diagnosis other than diphtheria had been made		50
Total showing B. Diphtheria present	10	
Total showing B. Diphtheria absent	40	
Per cent found to be diphtheria		20

Other organisms found to be associated with B. Diphtheria.

Staphylococci, 23.
Micrococcus Catarrhalis, 13.
Bacillus Fusiformis, 12.
Pneumococci, 11.
Streptococci, 10.
Bacillus Influenza, 1.

Other organisms found to predominate in cases that were diphtheria clinically but not bacteriologically.

	Swab.	Culture.
Streptococci	0	8
Pneumococci	1	1
Staphylococci	1	12
Micrococcus Catarrhalis	3	5
Leptothrix Buccalis	1	0
Saccharomyces Albicans	1	1
Bacillus Fusiformis	20	0

When Bacillus Fusiformis was present culture showed:
Streptococci, 19.
Staphylococci, 17.
Bacillus Diphtheria, 12.
Micrococcus Catarrhalis, 7.
Pneumococci, 1.
Bacillus Coli, 1.

Other organisms found in negative cases of suspected diphtheria.
Streptococci, 17.
Pneumococci, 29.
Staphylococci, 45.
Micrococcus Catarrhalis, 35.
Bacillus Influenza, 8.
Bacillus Fusiformis, 35.
Bacillus Coli, 1.

Description of Membrane.

Color White		34
Bacillus Diphtheria present	15	
Bacillus Diphtheria absent	19	
Color Gray		76
Bacillus Diphtheria present	34	
Bacillus Diphtheria absent	42	
Limited to one tonsil		46
Bacillus Diphtheria present	18	
Bacillus Diphtheria absent	28	
Involving both tonsils		53
Bacillus Diphtheria present	26	
Bacillus Diphtheria absent	27	
Extending to pharynx, pillars or vault		30
Bacillus Diphtheria present	12	
Bacillus Diphtheria absent	18	
Located in nose		5
Bacillus Diphtheria present	4	
Bacillus Diphtheria absent	1	
No membrane present		40
Bacillus Diphtheria present	18	
Bacillus Diphtheria absent	22	
Membrane not described		62
Bacillus Diphtheria present	26	
Bacillus Diphtheria absent	36	

MISCELLANEOUS EXAMINATIONS.

Under the head of miscellaneous a large variety of samples have been received. Some of these have been examinations for private purposes and charged for as examinations for "private purposes" according to Senate Bill 137.

It is not always possible to determine whether a given case is to be considered public or private according to this act. If the examination, clearly, is of some importance in diagnosing or locating the source of some contagious disease, no charges are justifiable under the act creating this laboratory. On the other hand, there are cases in which the possible relation of a given examination to contagious conditions may be extremely remote. This applies especially to certain more or less complete examinations which may be required of urines, feces, tumors, stomach contents, blood samples and even sputa. For instance, urines may be suspected of being or said to be suspected of being tubercular, but the laboratory examinations which are of value in establishing such a diagnosis are not limited to a search for tubercle bacilli, and there may be other findings which justify a positive diagnosis even though careful search fails to reveal tubercle bacilli. Blood samples to be examined for malarial organisms or Widal's reaction are clearly pertaining to contagious disease. But a complete examination or a differential count may or may not have anything to do with suspected contagion; and so with other material mentioned.

Examinations for the diagnosis of venereal inflection are unquestionably pertaining to contagious diseases, yet such cases are not reported and generally no information concerning the case is given to the laboratory or the community in which the case exists. Such examinations cannot therefore be considered of value to the community, but are merely of private interest and will be treated by the laboratory as examinations for private purposes.

Examinations of legal interest may be of considerable variety, but have consisted largely during the past year of toxicological examinations, identification of blood stains and alcohol determinations made upon various beverages sold in counties where the local option law is in effect. The poisons isolated and identified during the year from suspected criminal cases have been:

Arsenic.
Strychnine.
Morphine.
Atropine.
Croton Oil.

During the year three positive cases of malaria have been examined at the laboratory. All of these, however, have given a distinct history of having received the infection outside of the state, and we are inclined to think that unimported cases of malaria in Michigan are very infrequent.

Respectfully submitted,
(Signed) M. L. HOLM, Ph. C., M. D.,
Bacteriologist.

MICHIGAN TUBERCULOSIS EXHIBIT.

In order that this State might be properly represented at the Sixth International Congress on Tuberculosis, which was held in Washington, D. C., from September 21 to October 12, 1908, an exhibit, illustrating the scope and extent of the measures taken for the restriction and prevention of Tuberculosis in this State, was prepared by this Department and set up in the New National Museum Building in connection with exhibits from The Michigan State Association for the Prevention and Relief of Tuberculosis; the State Sanatorium, at Howell; the Hygienic Laboratory of the University of Michigan; Dr. A. S. Warthin, Professor of Pathology at the University of Michigan; the Board of Health of Detroit; the Detroit Anti-Tuberculosis Society; the Board of Health of Grand Rapids; the Grand Rapids Anti-Tuberculosis Society; the State Asylum, Kalamazoo; the Kalamazoo Anti-Tuberculosis Society; and the Michigan Reformatory, Ionia. Notwithstanding that this Department had no fund from which to defray the expense of such an exhibit, a very creditable showing was made and the Exhibit as a whole was very warmly commended. One of the exhibits prepared by this Department, a model of "The Michigan Shack," received Honorable Mention for Novel and Excellent Features.*

From Washington, in company with many other exhibits of the Congress, the Michigan Exhibit was transported to New York and was on exhibition in that city from November 30, 1908, to January 17, 1909.

During the latter part of the legislative session of 1909, the main portion of the Michigan Exhibit was set up in one of the corridors of the State Capitol, at Lansing, and attracted much attention.

From May 17 to 24, 1909, the Exhibit was in Battle Creek for the purpose of aiding the local Anti-Tuberculosis Society in awakening an interest and securing cooperation in their work.

Though not intended for a traveling exhibit, and being bulky in character, the Exhibit may be of much service to the local Societies and others engaged in the warfare against Tuberculosis in this State, and there are already indications that it will be in considerable demand for this purpose in the near future. As this Department has no fund at its disposal for the purpose of defraying the cost of transporting the Exhibit from place to place, the expense will have to be borne by the locality making use of the Exhibit.

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*A description of the Michigan exhibit, together with much interesting information relative to the Sixth International Congress on Tuberculosis, was published by this Department in the bulletin for the first quarter of 1909.

FINANCIAL STATEMENTS.

TOTAL AMOUNT AND CLASSIFICATION OF EXPENDITURE BY THE STATE BOARD OF HEALTH (UNDER PUBLIC ACT NO. 18 OF 1905), DURING THE FISCAL YEAR ENDING JUNE 30, 1909.

Expenses of members:	
Attending regular meetings	$ 45 68
Other expenses	241 17
Engraving, drawing, etc.	159 00
Instruments and books	158 10
Paper, stationery, etc.	1,672 82
Postage	1,000 00
Printing and binding	2,378 91
Secretary	2,500 00
Special investigations	72 63
Miscellaneous	771 69
Total	$9,000 00

NOTE.—The appropriation ($9,000.00) at the disposal of the State Board of Health for certain specified purposes, does not include clerk hire. The account of the appropriation ($10,000.00) for clerk hire is kept in the Auditor General's department, and is published in his annual report.

TOTAL AMOUNT AND CLASSIFICATION OF EXPENDITURES BY THE STATE BOARD OF HEALTH (UNDER SECTION 7 OF ACT 132, LAWS OF 1903, AS AMENDED BY ACT 151, LAWS OF 1907), EMBALMERS' FUND, AS ALLOWED DURING THE FISCAL YEAR, 1909.

RECEIPTS.		DISBURSEMENTS.	
Fees from applicants for license and for renewals of licenses	$1,400 50	Expenses of members:	
		Attending regular meetings	$ 7 79
		Other meetings and special investigations	390 93
		Instruments and books	81 00
		Paper, stationery, etc	116 22
		Postage	190 00
		Printing and binding	153 94
		Drawing, engraving, etc.	38 25
		Compensation of extra clerks	183 80
		Miscellaneous	229 31
		Unexpended balance, turned over to the State Treasurer	9 26
Total receipts	$1,400 50	Total disbursements	$1,400 50

TOTAL AMOUNT AND CLASSIFICATION OF EXPENDITURES BY THE STATE BOARD OF HEALTH, LABORATORY DEPARTMENT, (UNDER SECTION 5 OF ACT 109, LAWS OF 1907), AS ALLOWED DURING THE FISCAL YEAR 1908.

RECEIPTS.		DISBURSEMENTS.	
State Treasurer, by appropriation	$3,499 96	Salaries of bacteriologist and clerk	$3,000 00
Genesee county	125 00	Compensation of extra clerk.	294 91
Ionia county	40 00	Traveling expenses	27 19
		Postage	10 00
		Laboratory supplies	332 73
		Unexpended balance, turned over to State Treasurer	13
Total receipts	$3,664 96	Total disbursements	$3,664 96

PUBLIC HEALTH LEGISLATION IN MICHIGAN IN 1909.

During the legislative session of 1909, the following public acts were passed and approved:

ACT NO. 27, PUBLIC ACTS OF 1909.

An Act defining the powers and duties of local health officers and boards of health in the matter of the protection of the people of the state of Michigan from the disease known as tuberculosis.

The People of the State of Michigan enact:

(89) SECTION 1. Reports by physicians and others.—Tuberculosis is hereby declared to be an infectious and communicable disease. It shall be the duty of every physician in the state of Michigan to report in writing on a form to be furnished as hereinafter provided, the name, nativity, age, sex, color, occupation, place where last employed if known, and address, of every person known by said physician to have tuberculosis, to the health officer of the township, city or village in which said person resides, within twenty-four hours after such fact comes to the knowledge of said physician. It shall also be the duty of the chief officer having charge for the time being of any hospital, dispensary, asylum or other similar private or public institution in said state of Michigan, to report in like manner the name, nativity, age, sex, color, occupation, place where last employed if known, and previous address of every patient having tuberculosis who comes into his care or under his observation, within twenty-four hours thereafter.

(90) SEC. 2. This report shall be upon a blank form furnished by the State Board of Health, and such blank, in addition to the name, color, age, sex, nativity, occupation, place where last employed and present address, as stated above, shall give also the evidence upon which the diagnosis of tuberculosis has been made, the part of the body affected and the stage of the disease. All cases in which the sputum, urine, faeces, pus or any other bodily discharge, secretion or excretion shall contain the tubercle bacillus shall be regarded as open cases of tuberculosis, and the rules given below providing for disinfection of premises occu-

pied by cases of tuberculosis shall apply only to such open cases. All other cases shall be reported for statistical purposes and shall be subjected to frequent examinations. In the event of these becoming open cases, they shall become subject to the same restrictions as herein provided for all open cases. For each complete report sent in the physician reporting shall be allowed a fee of fifty cents out of the general fund in the state treasury after said report has been accepted by the State Board of Health and voucher issued therefor by the secretary of said board and approved by the board of state auditors.

Am. 1909, Act 317.

(91) Sec. 3. Examination of sputum.—It shall be the duty of every health officer of a township, city or village, when so requested by any physician or by authorities of any hospital or dispensary, to make or cause to be made a microscopical examination of the sputum or other bodily secretion or discharge forwarded to him as that of a person having symptoms of tuberculosis, which shall be forwarded to such officer in a package specified by the State Board of Health, accompanied by a blank giving name, nativity, age, sex, color, occupation, place where last employed if known, and address of the person whose sputum it is. It shall be the duty of said health officer promptly to make a report of the results of such examination free of charge to the physician or person upon whose application the same is made: Provided, That the examinations provided for in this section shall be made, on request of local health officers, by the State Board of Health.

(92) Sec. 4. Protection of records.—It shall be the duty of every health officer of a township, city or village to cause all reports made in accordance with the provisions of the first section of this act, and also all results of examinations showing the presence of the bacilli of tuberculosis made in accordance with the provisions of the third section of this act, to be recorded in a register to be furnished by the State Board of Health, of which he shall be the custodian, and a copy of which he shall transmit quarterly to the State Board of Health. Such register shall not be open to inspection by any person other than the health authorities of the state and of the said township, city or village, and said health authorities shall not permit any such report or record to be divulged so as to disclose the identity of the person to whom it relates, except as may be necessary to carry into effect the provisions of this act. The cost of all blanks, vouchers and registers by this act required to be furnished or issued by the State Board of Health shall be paid for by the board of state auditors out of the general fund in the state treasury, on presentation of vouchers approved by the secretary of the State Board of Health.

Am. 1909, Act 317.

(93) Sec. 5. Disinfection of premises.—In case of the vacating of any apartment or premises by the death or removal therefrom of a person having open tuberculosis, it shall be the duty of the attending physician, or if there be no such physician or if such physician be absent, of the owner, lessee, occupant or other person having charge of the said apartments or premises, if he knows or has been notified that such deceased person or persons who have been removed therefrom had open tuberculosis, to notify the health officer of said township, city or village of said death or removal within twenty-four hours thereafter, and such apartments or premises so vacated shall not again be occupied until duly disinfected, cleansed or renovated by the local board of health, in accordance with the methods endorsed and recommended by the State Board of Health.

(94) Sec. 6. Health officer to direct disinfection, cleansing or renovation.—When notified of the vacating of any apartments or premises as provided in section five hereof, the local health officer or one of his assistants or deputies shall within twenty-four hours thereafter visit said apartments or premises and shall order and direct that, except for purposes of cleansing or disinfection, no infected article shall be removed therefrom until properly and suitably cleansed or disinfected; and said health officer shall determine the manner in which such apartments or premises shall be disinfected, cleansed or renovated in order that they may be rendered safe and suitable for occupancy. If the health authorities determine that disinfection is sufficient to render them safe and suitable for occupancy, such apartments or premises, together with all infected articles therein, shall immediately be disinfected by the health authorities at public

expense. Should the health authorities determine that such apartments or premises are in need of thorough cleansing and renovation, a notice in writing to this effect shall be served upon the owner or agent of said apartments or premises, and said owner or agent shall thereupon proceed to the cleasing or renovating of such apartments or premises in accordance with the instruction of the health authorities, and such cleansing and renovation shall be done at the expense of the said owner or agent.

(95) Sec. 7. Prohibiting occupancy until order of health officer is complied with.—In case the orders or directions of the local health officer requiring the disinfection, cleansing or renovation of any apartments or premises or any articles therein as hereinbefore provided, shall not be complied with within forty-eight hours after such orders or directions shall be given, the health officer may cause a placard in words and form substantially as follows to be placed upon the door of the infected apartments or premises: "Tuberculosis is a communicable disease. These apartments have been occupied by a consumptive and may be infected. They must not be occupied until the order of the health officer directing their disinfection or renovation has been complied with. This notice must not be removed under the penalty of the law except by the health officer or other duly authorized official."

(96) Sec. 8. Prohibiting carelessness of a person having tuberculosis.—Any person having tuberculosis who shall dispose of his sputum, saliva or other bodily secretion or excretion so as to cause offense or danger to any person or persons occupying the same room or apartment, house, part of a house or premises, shall, on complaint of any person or persons subjected to such offense or danger, be deemed guilty of a nuisance and any person subjected to such a nuisance may make complaint in person or writing to the health officer of any township, city or village where the nuisance complained of is committed. It shall be the duty of the local health officer receiving such complaint to investigate, and if it appear that the nuisance complained of is such as to cause offense or danger to any person occupying the same room, apartment, house, part of a house or premises, he shall serve a notice upon the person so complained of, reciting the alleged cause of offense or danger and requiring him to dispose of his sputum, saliva or other bodily secretion or excretion in such a manner as to remove all reasonable cause of offense or danger. Any person failing or refusing to comply with orders or regulations of the local health officer of any township, city or village, requiring him to cease to commit such nuisance, shall be deemed guilty of a misdemeanor and on conviction thereof shall be fined not less than one nor more than ten dollars.

(97) Sec. 9. Protection of patient's family.—It shall be the duty of a physician attending a patient having tuberculosis to take all proper precautions and to give proper instructions to provide for the safety of all individuals occupying the same house or apartment, and if no physician be attending such patient this duty shall devolve upon the local health officer, and all duties imposed upon physicians by any section of this act shall be performed by the local health officer in all cases of tuberculosis not attended by a physician.

(98) Sec. 10. It shall be the duty of every local health officer to transmit to every physician reporting any case of tuberculosis, or to the person reported as suffering from this disease, provided the latter has no attending physician, a circular of information provided by the State Board of Health. This circular of information shall inform the consumptive of the precautions necessary to avoid transmitting the disease to others.

(99) Sec. 11. Penalty for failure of physician to perform duties or for making false reports.—Any physician or person practicing as a physician who shall fail to report any case of tuberculosis or who shall knowingly report as affected with tuberculosis any person who is not so affected, or who shall wilfully make any false statement concerning the name, nativity, age, sex, color, occupation, place where last employed if known, or address of any person reported as affected with tuberculosis, or who shall certify falsely as to any of the precautions taken to prevent the spread of infection, shall be deemed guilty of a misdemeanor and on conviction thereof shall be subject to a fine of not more than one hundred dollars.

(100) Sec. 12. Reporting recovery of patient.—Upon the recovery of any person having tuberculosis, it shall be the duty of the attending physician to make a report of this fact to the local health officer, who shall record the same in the

records of his office, and shall relieve said person from further liability to any requirements imposed by this act.

(101) Sec. 13. General penalty.—Any person violating any of the provisions of this act shall be deemed guilty of a misdemeanor and upon conviction thereof shall be punished, except as herein otherwise provided, by a fine of not less than five dollars nor more than fifty dollars.

Sec. 14 repeals inconsistent acts.

This act is ordered to take immediate effect.
Approved June 2, 1909.

ACT NO. 28, PUBLIC ACTS OF 1909.

An Act in relation to the supervision and control by the State Board of Health over water works systems, and providing penalties for the violation of this act.

The People of the State of Michigan enact:

(34) Section 1. The State Board of Health and its authorized agents and representatives are each hereby given supervisory and visitorial power and control over all corporations other than municipal, partnerships and individuals engaged in furnishing water to the public for household or drinking purposes and over the plants and systems owned or operated by such companies or individuals.

(35) Sec. 2. The State Board of Health, its agents and representatives referred to in the preceding section, shall have the power and authority to enter upon, at all reasonable times, the pumping plants, filtering plants, reservoirs, standpipes, cribs and other property of said companies or individuals, for the purpose of inspecting the same and carrying out the authority vested in them by this act.

(36) Sec. 3. The State Board of Health shall have authority to make and enforce such rules and regulations as it may deem necessary, governing and providing a method of conducting and operating the entire or any part of the system of water works, including the filtration plants owned or operated by said corporations other than municipal, partnerships or individuals, and may provide penalties for the non-compliance with such rules and regulations, and said board shall, in addition to the other powers hereby vested in it, whenever it shall deem it necessary for the protection of health, have authority to direct a corporation, partnership or individual operating water works systems to cleanse any portion of such system as it may deem necessary, and to operate the same in such a manner as to furnish pure and wholesome water, and to enforce such directions by rule or regulations.

(37) Sec. 4. Whenever the mayor of a city, president of a village, supervisor of a township, health officer or representative of the State Board of Health has reason to believe that the water furnished by any corporation other than municipal, partnership or individual is contaminated, then it shall be the duty of the State Board of Health to investigate the same and to determine by laboratory analysis the condition of said water, and the certificate of the state bacteriologist showing result of such analysis shall be prima facie evidence of the matters stated in such certificate and also as to the source of the water and the time and place of taking, and of all matters that may be stated in said certificate.

(38) Sec. 5. The expense of the investigation and analysis made by the State Board of Health, whenever called upon by a jurisdiction wherein a corporation other than municipal, partnership or individual is operating a public water plant shall be borne by the locality, and shall be paid for at the rate of five dollars per day and necessary traveling expenses while making said investigation and analysis, and shall constitute a charge against the city, village or township asking for such investigation; the said amount of five dollars to be covered into the state treasury to the credit of the State Board of Health laboratory fund in addition to the amount already appropriated.

(39) Sec. 6. It shall be the duty of all companies, except as herein provided, partnerships or individuals now or hereafter operating water works system in this state to file with the clerk of the city, village or township where such system is operated or located and also with the State Board of Health a true copy of the plans and specifications of the entire system owned or operated by such

corporation other than municipal, partnership or individual including such filtration or other purifying plant as may be operated by them, and also plans and specifications of all alterations, additions or improvements to said system which may be made by such corporation other than municipal, partnership or individual from time to time. The plans and specifications herein referred to shall, in addition to all other things, show all the sources through or from which water is or may be at any time pumped or otherwise permitted or caused to enter into such system. Such plans and specifications shall be certified by some proper officer of said company or by some individual member of any unincorporated company, who is acquainted with the facts. If within sixty days after this act shall take effect or within sixty days after any corporation other than municipal, partnership or individual shall commence to operate or within sixty days after any alterations, additions or improvements shall be made by such corporation other than municipal, partnership or individual, any corporation other than municipal, partnership or individual, subject to the provisions of this act shall fail to file a copy of the plans and specifications as provided in the preceding section or shall file false or incomplete copies of such plans and specifications, such corporation other than municipal, partnership or individual shall be subject to a penalty of twenty-five dollars for each and every day it shall fail or neglect to file such plans and specifications, which penalty may be collected in any court of competent jurisdiction by the said city, village or township in which such plans and specifications should be filed and such penalty shall be in addition to all other penalties in this act.

(40) Sec. 7. The words "plans and specifications," as used in this act shall be construed to mean a true representation of the entire system operated by such corporation, partnership or individual as the same shall be actually in use at the time of filing the same, and also a full and fair statement of how the same is operated.

(41) Sec. 8. In case of corporations other than municipal, partnerships or individuals operating filtration plants in which there are beds or other appliances to be cleansed, it shall be the duty of such companies to file with the State Board of Health, clerk of the city, village or township in which the system is operated an annual report under oath, on or before the first day of January of each year, showing the dates on which and the number of times such beds or appliances were cleansed during the preceding year. Such report shall be sworn to by any person acquainted with the facts and employed by the company at the time of making said report. Any person making a false statement under the provisions of this section shall be deemed guilty of and subject to the penalty of perjury. Any corporation, partnership or individual whose duty it shall be to file the report as herein provided shall be subject to a fine of fifty dollars for each and every violation thereof, and in addition thereto a penalty of fifty dollars to be recovered in any court of competent jurisdiction by the city, village or township in which such system is operated.

(42) Sec. 9. Any corporation other than municipal, partnership, company or individual who shall violate any provision of this act where no other penalty is provided herein, or who shall violate or fail to or neglect to perform or comply with any rule or regulation made or adopted by any board or officer under the provisions of this act, shall be guilty of a misdemeanor and shall be punished therefor as provided by law.

Approved April 12, 1909.

ACT NO. 98, PUBLIC ACTS OF 1909.

An Act to amend section fifteen of chapter thirty-five of the revised statutes of eighteen hundred forty-six, relative to the preservation of the public health, quarantine, nuisances and offensive trades, being section one thousand six hundred forty-seven of Howell's annotated statutes, as amended, and being section four thousand four hundred twenty-four of the Compiled Laws of eighteen hundred ninety-seven, as amended by act number seven of the Public Acts of nineteen hundred three.

The People of the State of Michigan enact:

Section 1. Section fifteen of chapter thirty-five of the revised statutes of eighteen hundred forty-six, relative to the preservation of the public health, quarantine, nuisances and offensive trades, being section one thousand six hundred forty-seven of Howell's annotated statutes, as amended, and being section four thousand four hundred twenty-four of the Compiled Laws of eighteen hundred ninety-seven, as amended by act number seven of the public acts of nineteen hundred three, is hereby amended to read as follows:

SEC. 15. When any person coming from outside the county or residing in any township, city or village within this state shall be infected or shall lately before have been infected with a dangerous communicable disease, the board of health of the township, city or village where such person may be shall make effectual provision in the manner in which it shall judge best for the safety of the inhabitants, and it may remove such sick or infected person to a separate house if it can be done without danger to his health, and shall provide nurses and other assistance and necessaries which shall be at the charge of the person himself, his parents or other persons who may be liable for his support, if able: *Provided*, If such person, his parents or other person who may be liable for his support, be not able to pay for such assistance and necessaries, the board of health shall keep an itemized and separate statement of expenses incurred for each and every person cared for under this section and shall render such statement to the board of supervisors of the county by filing the same with the county clerk. The said board of supervisors shall, as soon as may be, proceed to audit the said bill, and if found that the expenses were necessarily incurred, the services actually and necessarily performed and the amounts claimed for such expenses and services are severally just and reasonable under the circumstances, the said board of supervisors shall allow the same or such parts thereof as the majority of the members elect of said board shall deem just, and provide for their immediate payment by the said county; and in auditing such accounts said several boards of supervisors shall have full power to examine into the merits of all claims presented to them in accordance with the provisions herein contained, and may subpoena witnesses and take any other measures necessary to arrive at the truth of the same; and the said board of supervisors is hereby empowered, if necessary, to issue orders or borrow money on the faith and credit of the county to pay all such necessary bills and expenses and to include the same in the next appropriation of money to be raised by taxation in said county: *Provided*, The board of supervisors or county board of auditors shall fix the maximum fee and mileage for medical attendance upon contagious diseases chargeable to the county, and shall authorize the superintendents of the poor, upon the application of any board of health of a township, city or village, to contract with a physician or physicians to attend contagious diseases.

Approved May 18, 1909.

ACT NO. 122, PUBLIC ACTS OF 1909.

An Act to amend sections three and five of act number one hundred nine of the public acts of nineteen hundred seven, entitled "An act to provide for the appointment of a bacteriologist by the State Board of Health; to provide for the purchase of the necessary appliances and apparatus for bacteriological examinations, and providing an appropriation therefor."

The People of the State of Michigan enact:

SECTION 1. Sections three and five of act number one hundred nine of the public acts of nineteen hundred seven, entitled "An act to provide for the appointment of a bacteriologist by the State Board of Health; to provide for the purchase of the necessary appliances and apparatus for bacteriological examinations, and providing an appropriation therefor." are hereby amended to read as follows:

SEC. 3. The various boards of health, health officers, and all state institutions may require a bacteriological examination or analysis of blood, sputum, urine, water, milk, or other substance in localities where there is an outbreak of any contagious disease or epidemic in which bacteriological examination or analysis may be necessary to the public health and welfare, or for the purpose of locating sources of infection, or contamination of water, milk, ice, etc., as the case may be. The said State Board of Health shall also be required to make an examination and analysis of the water used by the public, and of public water supplies, when contamination is suspected, whenever the examination or analysis is required by the mayor of any city, the president of any village, or the supervisor of any township. Such boards or officers shall forward or deliver to the secretary of the State Board of Health a sample of the substance required to be analyzed, in a sealed package or jar accompanied by a statement from such board or officer, indicating the necessity for the analysis. The examination or analysis for the boards or officers above named shall be made free of charge. The State Board of Health shall also make a bacteriological examination or analysis in all matters of a criminal nature whenever requested by the prosecuting attorney of the county in which the case may arise: *Provided, however,* That any prosecuting attorney requiring any analysis of a criminal nature, or any private individual, corporation or association requiring an analysis for private purposes, shall be required to pay to the State Board of Health, upon the completion of the analysis, the nominal cost of the materials used and for the time necessarily spent in making such examination or analysis, which amounts shall constitute a charge against the particular county, private individual, corporation or association, and shall together with all fees for expert testimony be turned into the state treasury to the credit of the bacteriological fund, in addition to the amount herein provided, and may be drawn by the State Board of Health in the manner now provided by the accounting laws of this state for the purpose of maintaining or adding to the equipment of the bacteriological division of the department of health.

SEC. 5. There is hereby appropriated annually out of any moneys in the state treasury to the credit of the general fund the sum of five thousand dollars for the purpose of carrying out the provisions of this act, which amount shall be paid to the State Board of Health in the manner now provided by the general accounting laws of this state. The auditor general shall add to and incorporate in the state tax for the year nineteen hundred nine and every year thereafter the sum of five thousand dollars, which when collected shall be used to reimburse the general fund in the state treasury for the amount appropriated by this act.

This act is ordered to take immediate effect.

Approved May 26, 1909.

ACT NO. 139, PUBLIC ACTS OF 1909.

An Act relative to the maintenance and construction of hospitals and sanatoria within the counties of this state and to provide a tax to raise moneys therefor.

The People of the State of Michigan enact:

(256) SECTION 1. The several boards of county supervisors of this state may raise by a tax to be levied on the property of said county, subject to taxation for county purposes, a sum of money to be used for constructing or maintaining or assisting to construct or maintain any hospital or sanitarium within said county. The said board of supervisors shall designate the hospital or sanitarium for which the moneys so raised are to be used: *Provided,* That any county not having within its boundary a hospital or sanitarium or any county though having a hospital or sanitarium within its boundary wishing to act in conjunction with any other county or counties for the purposes herein provided, may, in the judgment of the board of supervisors, use said moneys so raised in such combined undertaking of said several counties.

(257) SEC. 2. The tax provided for herein shall be apportioned and collected as other taxes for county purposes. Said tax shall not exceed one-tenth of one mill on each dollar of assessed valuation of said county, and in no case shall the amount exceed one thousand dollars for any one year, unless the same shall have been submitted to a vote of the qualified electors of such county.

(258) SEC. 3. When the tax herein provided for shall be collected it shall be paid to the institution for which the same is raised, upon the warrant of the president and secretary thereof from time to time as vouchers are presented, and shall be expended by said board for the use of said institution within the limits prescribed by this act.

(259) SEC. 4. It shall be the duty of the trustees or other officers of any hospital or sanitarium receiving any such assistance, to report once a year to the board of supervisors of the county granting such assistance. Such report shall

set forth in detail the number of the patients cared for during the year, the average cost per person, the amount of money received from all sources, the amount of money expended and to whom paid, and a tabulated statement of the number of persons admitted, the disease, or other cause of their admission, and the disposition made of each case, which said report shall be included and made a part of the record of said board of supervisors.

Approved May 26, 1909.

ACT NO. 141, PUBLIC ACTS OF 1909.

An Act to amend section one of act number one hundred forty-six of the public acts of eighteen hundred ninety-five, entitled "An act to provide for teaching in the public schools the modes by which the dangerous communicable diseases are spread and the best methods for the restriction and prevention of such diseases," approved May sixteen, eighteen hundred ninety-five, said section being compiler's section four thousand seven hundred ninety-six of the Compiled Laws of eighteen hundred ninety-seven.

The People of the State of Michigan enact:

SECTION 1. Section one of act one hundred forty-six of the public acts of eighteen hundred ninety-five, entitled "An act to provide for teaching in the public schools the modes by which the dangerous communicable diseases are spread, and the best methods for the restriction and prevention of such diseases," approved May sixteen, eighteen hundred ninety-five, said section being compiler's section four thousand seven hundred ninety-six of the Compiled Laws of eighteen hundred ninety-seven, is hereby amended to read as follows:

SEC. 1. There shall be taught in every year in every public school in Michigan the principal modes by which each of the dangerous communicable diseases are spread and the best methods for the restriction and prevention of each such disease. Such instruction shall be given by the aid of text-books on physiology, supplemented by oral and blackboard instruction. From and after July first, nineteen hundred ten, no text-book on physiology shall be adopted for use in the public schools of this state, unless it shall give at least one-eighth of its space to the causes and prevention of dangerous communicable diseases. Text-books used in giving the foregoing instruction shall, before being adopted for use in the public schools, have that portion given to the instruction in communicable diseases approved by the State Board of Health to the State Board of Education.

Approved May 26, 1909.

ACT NO. 142, PUBLIC ACTS OF 1909.

An Act to provide for securing and transporting unclaimed dead human bodies to be used for dissection in the advancement of science.

The People of the State of Michigan enact:

(260) SECTION 1. Any member of either of the following boards and any of the following named officers or persons, to-wit: The board of health of any city, village or township, the common council of any city, board of trustees of any village, any board or officer having the direction, management, charge or control in whole or in part of any prison, house of correction, workhouse, jail or lockup, founded or supported in whole or in part at public expense, having in his or their possession or control, the dead body of any person not claimed by any relative or legal representative; or the county superintendent of the poor, keepers of poorhouses and almshouses, any physician or other person in charge of any poorhouse or almshouse or charitable institution, sheriff or coroner, having in his or their possession or control the dead body of any person not claimed by any relative, personal friend or legal representative as hereinafter provided, and which may be required to be buried at public expense or the expense of any one of such public institutions, or the dead body of any convict who died in prison under sentence of murder or attempt to murder, not claimed by any relative, personal friend or legal representative, shall deliver such dead body or bodies

within thirty-six hours after death, or after he or they shall become possessed thereof, to a licensed embalmer who shall, after preparing the body for shipment, place it in a plain coffin and outer box plainly directed to the demonstrator of anatomy of the "University of Michigan, Ann Arbor, Michigan," and deliver the same together with a transit permit, as provided by the State Board of Health, to the express or railway company at the nearest railway station, excepting only the dead bodies of such persons as shall have died of smallpox, diphtheria or scarlet fever: *Provided*, That in the county of Wayne the dead bodies hereinbefore described shall be sent in the same manner and under the same restrictions as those sent to the demonstrator of anatomy of the university of Michigan, either to the demonstrator of anatomy of the Detroit College of Medicine, or to the demonstrator of anatomy of the Detroit Homeopathic College. Such boards, common councils, officers or other persons making such shipment or delivery, shall as the case may be take the usual shipping receipt or a fully particularized receipt for such package and shall notify the consignee of such shipment by letter mailed on the day the package is so delivered to the express or railway company, or within the county of Wayne, delivered concurrently by messenger or otherwise with the delivery of such package, and shall also enclose in such letter a statement giving, as nearly as can be ascertained, the name, age, residence and cause of death of such deceased person, whose body has been shipped or is being delivered as aforesaid; and also a statement of the cost and expenses which have been incurred in the storage and preparation of the body for shipment, in the rental of the coffin and box, and in the delivery of the same to the transportation company; and upon the receipt of the package so shipped to him, the demonstrator of anatomy of the University of the State of Michigan shall immediately forward to such officer, board, council or institution or person or persons making such shipment or incurring such expenses the amount thereof, not exceeding in any case the sum of fifteen dollars, exclusive of the cost of transporting the body and the cost of returning the coffin and box to the consignor: *Provided*, That the transportation charges for any corpse by any railway company or express company shall be the price of one first-class passenger fare between the points of shipment, but in no case shall the charge be less than two dollars, and no railway company or express company shall require such corpse to be accompanied by a person. Upon the receipt of a package so delivered to him, the demonstrator of anatomy of the Detroit College of Medicine or of the Detroit Homeopathic College, as the case may be, shall immediately forward to such officer, board, council or institution or person or persons making such delivery or incurring such expenses, the amount thereof not exceeding in any case the sum of seven dollars: *Provided*, Such dead body shall not be shipped or delivered as aforesaid if it shall be requested in good faith for interment by any relative before the same shall have been delivered as aforesaid, and in case the dead body of any person so delivered or so shipped as aforesaid be subsequently claimed or demanded of either of said demonstrators of anatomy, or of any other person or institution, into whose possession or under whose control it may have been placed by virtue of the provisions of the law, by any relative or legal representative of such deceased person for private interment, it shall be given up to such claimant, even after the same shall have been interred as hereinafter provided, after they shall have paid the actual expenses incurred and paid by the demonstrator of anatomy or by any person or institution into whose possession or under whose control it may have been placed by virtue of the provisions of this act. Such bodies shall be used only for the purposes hereinafter mentioned, and shall then in all cases be interred in some suitable place kept for that purpose and a correct record shall be kept of every such body; and all matters by which such body may be identified, coming to the knowledge of the person or officer at any time in charge of such bodies, shall be faithfully recorded at length in a book kept for that purpose, to the end that the same may at any time be traced and discovered by the friends and relatives of such deceased person: *Provided*, That the institution, board, council, officer or person aforesaid, shall immediately after the death of such person notify, if possible, by telegraph, or otherwise by letter, one or more of the nearest known relatives of such deceased person of the death of such person; and in no other case shall the body of such deceased person be shipped or delivered as aforesaid until after the expiration of twenty-four hours from death. Every individual, officer or party violating any of the provisions of this section shall be deemed guilty of a misdemeanor.

(261) SEC. 2. The bodies so shipped or delivered as aforesaid shall be used for the advancement of anatomical science in this state in the following institutions of learning, only, viz: The University of Michigan, the Detroit College of Medicine and the Detroit Homeopathic College. The said bodies shall be distributed to and among the same equitably and, as far as possible, in the order in which they are received, and the number assigned to each by the said demonstrator of anatomy shall be proportional to that of its students of anatomy in actual attendance, and to this end the said demonstrator of anatomy shall, within ten days after the opening of the scholastic year of each of said institutions, ascertain from the dean or other executive officer of said institutions the number of students of anatomy in actual attendance in the said respective institutions. The said demonstrators of anatomy shall, upon ascertaining the number of students of anatomy in actual attendance in said institutions, each notify the other in writing of the information thus obtained; and at any time thereafter, upon the written request of either of said demonstrators of anatomy delivered or mailed to the others, the said demonstrators of anatomy shall ascertain and inform each other in writing of the number of students of anatomy in actual attendance in the said institution, to the end that at all times the distribution of said bodies may be equitable and proportionable to the number of students of anatomy in actual attendance in the said institutions. In order to procure a fair and proportionable distribution of bodies in quality as well as in quantity, each demonstrator of such institution may throw out any body which when received, shall in his opinion be unfit and worthless for the advancement of anatomical science, and shall not count such body as anatomical material when received, but on his request to the other demonstrators or to any one of them shall be supplied by such demonstrator applied to with the proportionate number of good bodies fit for use for the necessary instruction. The demonstrators of anatomy of the aforesaid institutions shall each make annually in the last week of the month of June, a sworn statement of the actual expenses borne and incurred by him under the provisions of this act; and from such statements the total cost of the anatomical material received shall be ascertained by a board consisting of all of said demonstrators, and shall be apportioned and paid by such institutions in proportion to the number of bodies used by each of said institutions: *Provided, however,* That either of the said demonstrators of anatomy upon the receipt of every body under and by virtue of the provisions of this act, shall cause the same to be embalmed or put in a state of preservation, and shall not permit the same to be delivered to any of said institutions for the purpose of dissection until the same shall have been in his possession at least ten days. It shall be the duty of the said demonstrator of anatomy of the University of Michigan and the said demonstrator of anatomy of the Detroit College of Medicine and the said demonstrator of anatomy of the Detroit Homeopathic College, upon the receipt of any body under the provisions of this act, to immediately notify either by mail or telegraph as he may deem best, the relatives of such deceased person, if known, of the receipt of such body and that said body will be preserved intact for the space of ten days, in which time the said relative will be entitled to said body for the purpose of interment, and shall pay such expenses, and the demonstrator of anatomy, in whose possession or under whose control the said body may be, shall deliver to such relative or such legal representative the said body, together with the said coffin and box enclosing the same; but in case said body shall not be requested by such relatives until after the same shall have been applied to the purposes intended, the remains thereof together with the coffin and box aforesaid shall be delivered without charge: *Provided,* That the University of Michigan, the Detroit College of Medicine and the Detroit Homeopathic College aforesaid, and each and every other medical institution, shall not receive into their possession any bodies procured in this state other than those provided for by the provisions of this act. Every individual or party violating the provisions of this section shall be deemed guilty of a misdemeanor. No such dead body shall be sold or delivered to any person to be taken out of the state, nor shall any such dead body be shipped to any person or place out of the state, with the exception of the provision for reclaimed bodies as aforesaid, or be used within the state for any purpose, except for the prosecution of anatomical science. Any person violating any of the provisions

of this act shall be punished by a fine of not less than fifty nor more than one hundred dollars, or by imprisonment in the county jail not less than one nor more than three months, or by both such fine and imprisonment in the discretion of the court. Any practicing physician or surgeon of this state, or any medical student under the authority of such physician or surgeon, may have in his possession human dead bodies or the parts thereof, lawfully obtained, for the purposes of anatomical inquiry or dissection.

Approved May 26, 1909.

ACT NO. 210, PUBLIC ACTS OF 1909.

An Act to provide for sanitary conditions in railroad passenger coaches and in railroad depots and vessels.

The People of the State of Michigan enact:

(43) SECTION 1. It shall be unlawful for any person to expectorate upon the floor, platform or the interior furnishings, except cuspidors, of a steam railroad, passenger or street railway car, or upon the floor, furnishings, registers or radiators of any passenger station or public waiting room. Any person who violates any of the provisions of this act shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be punished by a fine of not more than twenty-five dollars or imprisoned not to exceed sixty days, or both such fine and imprisonment in the discretion of the court: *Provided, however,* That no person shall be prosecuted under the provisions of this section unless its provisions are posted in a conspicuous place in such cars, stations and public waiting rooms, and suitable cuspidors are furnished.

(44) SEC. 2. It shall be the duty of railway companies to see that every passenger coach is kept at a uniform temperature, not less than sixty nor more than seventy degrees, and that provision for ventilation shall be constantly in use to provide a sufficient amount of fresh air for the passengers.

(45) SEC. 3. Every passenger coach shall be provided with a supply of good wholesome drinking water. When ice is used to cool the water, it shall be kept in a separate receptacle. These tanks shall be thoroughly cleaned at the terminus of every trip, and shall be kept constantly covered.

(46) SEC. 4. All toilet rooms, water closets, urinals and toilet appliances in railway coaches and depots are to be scrubbed with soap and hot water and disinfected with an approved disinfectant each day. All closets (outhouses) at railway stations shall be kept clean and in good repair to be suitable at all times for the use of the traveling public. The vaults shall receive a daily treatment of fresh lime or other approved disinfectant, and the contents removed at least once each month.

(47) SEC. 5. Every passenger coach while in regular use, shall be thoroughly cleansed and disinfected at least once each month. If a car becomes infected by being occupied by a person having a dangerous communicable disease, it shall not again be opened for the reception of other passengers than the ones already in it; and at the end of the trip it shall be disinfected before it is again used for passenger traffic. In cases of public exposure of this kind on railway trains, it shall be the duty of the railway authorities to report the facts to the State Board of Health, giving the names and destination of each exposed passenger that occupied the same car as the infected person.

(48) SEC. 6. Every passenger coach operating in this state, and every vessel navigating upon the rivers and inland lakes of the state, or entering her lake harbors, shall be provided with urinals and closets of such form as will secure the sterilization of all discharges entering them; and the same shall be known as the "Aseptic closet and urinal." The form of the urinal and closet, including the method of sterilization, shall have the approval of the State Board of Health before adoption.

(49) SEC. 7. In case any railroad or vessel company operating in this state, shall neglect or refuse to carry out the provisions of the preceding sections, it shall be liable to a penalty of one hundred dollars and cost of prosecution for each and every passenger train so run, to be sued for in the name of the people of the state of Michigan.

Approved June 1, 1909.

ACT NO. 243, PUBLIC ACTS OF 1909.

An Act to amend section one of act number forty-five of the public acts of eighteen hundred ninety-five, entitled "An act to prevent the introduction of a dangerous communicable disease in any township, city or village in Michigan, except under specified regulations."

The People of the State of Michigan enact:

SECTION 1. Section one of act number forty-five of the public acts of eighteen hundred ninety-five, entitled "An act to prevent the introduction of a dangerous communicable disease in any township, city or village in Michigan, except under specified regulations," said section being compiler's section four thousand four hundred seventy-one of the Compiled Laws of eighteen hundred ninety-seven, is hereby amended to read as follows:

SEC. 1. No person sick with cholera, smallpox, diphtheria, scarlet fever or any other communicable disease dangerous to the public health, and no article which has been infected or is liable to propagate or convey any such disease, shall some or be brought into any township, city or village in Michigan, without the special permit of the board of health or of the health officer of said township, city or village, and then only under the supervision of the health officer of said township, city or village.

Approved June 2, 1909.

ACT NO. 272, PUBLIC ACTS OF 1909.

An Act to authorize the boards of health of the several townships of this state to acquire and enlarge burying grounds and approaches thereto in their respective townships and to provide the manner of acquiring private property for such purpose.

The People of the State of Michigan enact:

(197) SECTION 1. The boards of health of the several townships of this state, whenever they may deem it desirable and necessary, may provide new burying grounds in their respective townships, or may enlarge the limits of any existing burying grounds therein, and may provide for suitable approaches thereto, or may enlarge the limits of any existing approach to any burying ground in said township; and, in case said board of health shall be unable to agree with the owner or owners of any land or any rights therein which said board of health desire to include within the limits of such burying ground or approaches thereto, as to the compensation to be paid therefor, said board of health may authorize one or more of its members to apply to the circuit judge or any circuit court commissioner of said county, or to any justice of the peace of said township for a jury of the vicinage to ascertain and determine the just compensation to be paid for the real estate acquired by said board of health for said burying ground or approaches thereto, or any enlargement thereof, and the necessity for using the same; which application shall be in writing and shall describe the real estate required by such board as accurately as is required in a conveyance of real estate.

(198) SEC. 2. It shall be the duty of such circuit judge, circuit court commissioner, or justice of the peace, upon such application being made to him, to issue a summons or venire, directed to the sheriff or any constable of the county, commanding him to summon eighteen freeholders residing within the vicinity of such site, who are in no wise of kin to the owner of such real estate, and not interested therein, to appear before such judge, commissioner, or justice at the time and place therein named, not less than twenty nor more than fifty days from the time of issuing such summons or venire, as a jury to ascertain and determine the just compensation to be made for the real estate required by such board of health for burying ground purposes, and the necessity for using the same, and to notify the owner or occupant of such real estate, if he can be found in the county, of the time when and the place where such jury is summoned to appear, and the object for which such jury is summoned; which notice shall be served at least ten days before the time specified in such summons or venire for the jury to appear as hereinbefore mentioned.

(199) SEC. 3. Thirty days previous notice of the time when and the place where such jury will assemble shall be given by the board of health of such township, where the owner or owners of such real estate shall be unknown, non-residents of the county, minors, insane, non compos mentis, or inmates of any prison, by publishing the same in a newspaper published in the county where such real estate is situated; or if there be no newspaper published in such county, then in some newspaper published in the nearest county where a newspaper is published, once in each week for four successive weeks, which notice shall be signed by the board of health or by the township clerk of such township, and shall describe the real estate required for such burying ground, and state the time when and the place where such jury will assemble, and the object for which they will assemble; or such notice may be served on such owner personally, or by leaving a copy thereof at his last place of residence.

(200) SEC. 4. It shall be the duty of such judge, commissioner, or justice, and of the persons summoned as jurors, as hereinbefore provided, and of the sheriff or constable summoning them, to attend at the time and place specified in such summons or venire; and the officer who summoned the jury shall return such summons or venire to the officer who issued the same, with the names of the persons summoned by him as jurors, and shall certify the manner of notifying the owner or owners of such real estate, if he was found; and if he could not be found in said county, he shall certify that fact. Either party may challenge any of the said jurors for the same causes as in civil action. If more than twelve of said jurors in attendance shall be found qualified to serve as jurors, the officer in attendance, and who issued the summons or venire for such jury, shall strike from the list of jurors a number sufficient to reduce the number of jurors in attendance to twelve; and in case less than twelve of the number so summoned as jurors shall attend, the sheriff or constable shall summon a sufficient number of freeholders to make up the number of twelve; and the officer issuing the summons or venire for such jury, may issue an attachment for any person summoned as a juror who shall fail to attend, and may enforce obedience of such summons, venire or attachment, as courts of record, or justices' courts are authorized to do in civil cases.

(201) SEC. 5. The twelve persons selected as the jury shall be duly sworn by the judge, commissioner, or justice in attendance, faithfully and impartially to inquire, ascertain, and determine the just compensation to be made for the real estate required by such board of health for such burying ground, and the necessity for using the same in the manner proposed by such board of health, and the persons thus sworn shall constitute the jury in such case. Subpoenas for witnesses may be issued, and their attendance compelled by such circuit judge, commissioner, or justice in the same manner as may be done by a circuit court or by a justice court in civil cases. The jury may visit and examine the premises, and from such examination and such other evidences as may be presented before them, shall ascertain and determine the necessity for using such real estate in the manner and for the purpose proposed by such board of health, and the just compensation to be made therefor; and if such jury shall find that it is necessary that such real estate shall be used in the manner or for the purpose proposed by such board of health, they shall sign a certificate in writing, stating that it is necessary that said real estate, describing it, should be used as a burying ground or as an addition to a burying ground already established in such townships, or as an approach thereto; also stating the sum to be paid by such township as the just compensation for the same. The said circuit judge, circuit court commissioner, or justice of the peace, shall sign and attach to and endorse upon the certificate thus subscribed by the said jurors, a certificate stating the time when and the place where the said jury assembled, that they were by him duly sworn as herein required, and that they subscribed said certificate. He shall also state in such certificate who appeared for the respective parties on such hearing and inquiry, and shall deliver such certificates to the township clerk, or to any member of the board of health of such township.

(202) SEC. 6. Upon filing such certificates in the circuit court of the county where such real estate is situated, such court shall, if it finds all the proceedings regular, render judgment for the sum specified in the certificate signed by such jury, against such township, which judgment shall be collected and paid in the manner as other judgments against townships are collected and paid.

(203) SEC. 7. In case the owner of such real estate shall be unknown, insane,

non compos mentis, or an infant, or cannot be found within such county, it shall be lawful for the said township to deposit the amount of such judgment with the county treasurer of such county, for the use of the person or persons entitled thereto; it shall be the duty of such county treasurer to receive such money, and at the time of receiving it, to give a receipt or certificate to the person depositing the same with him, stating the time when such deposit was made, and for what purpose; and such county treasurer and his sureties shall be liable on his bond for any money which shall come into his hands under the provisions of this act, in case he shall refuse to pay or account for the same, as herein provided: *Provided*, That no such money shall be drawn from such county treasury except upon an order of the circuit court, circuit court commissioner, or judge of probate, as hereinafter provided.

(204) SEC. 8. Upon satisfactory evidence being presented to the circuit court of the county where such real estate lies, that such judgment, or the sum ascertained and determined by the jury as the just compensation to be paid by such district for such burying grounds, has been paid, or that the amount thereof has been deposited according to the provisions of the preceding sections, such court shall, by an order or decree, adjudge and determine that the title in fee of such real estate shall, from the time of making such payment or deposit, forever thereafter be vested in such township and its successors and assigns, and shall, in and by such order or decree, award to such township a writ of possession for the recovery of the possession of such real estate, a copy of which order or decree, certified by the clerk of said county, shall be recorded in the office of the register of deeds of such county, and the title of such real estate shall thenceforth, from the time of making such payment or deposit, be vested forever thereafter in such township and its successors and assigns in fee.

(205) SEC. 9. Such township may, at any time after making the payment or deposit hereinbefore required, enter upon and take possession of such real estate for the use of said township. And it shall be the duty of the county clerk of said county, on the request of said township, to issue out of and under the seal of the circuit court of said county a writ of possession as awarded in such order or decree; which writ shall be directed to the sheriff of said county, and shall be tested and made returnable, and shall be substantially, so far as may be, in the same form provided for writs of possession in actions of ejectment; and it shall be the duty of such sheriff thereupon to remove the respondent or respondents in such proceedings, and all persons holding under them, or either of them, from the real estate described in such decree and in such writ, and deliver the possession thereof, with the appurtenances, to such township.

(206) SEC. 10. In case the jury hereinbefore provided for shall not agree, another jury may be summoned in the same manner, and the same proceedings may be had, except that no further notice of the proceedings shall be necessary; but instead of such notice, the judge, commissioner, or justice may adjourn the proceedings to such times as he shall think reasonable, not exceeding thirty days, and shall make the process to summon a jury returnable at such time and place as the said proceedings shall be adjourned to. Such proceedings may be adjourned from time to time by the said judge, or commissioner, or justice, on the application of either party, and for good cause, to be shown by the party applying for such adjournment unless the other party shall consent to such adjournment; but such adjournments shall not in all exceed three months.

(207) SEC. 11. In case the said burying grounds or addition or approach thereto, is encumbered by mortgage, levy, tax sale, or otherwise, as aforesaid, the mortgagee, or other parties claiming to be interested in said title, shall severally be made a party to the procedure as aforesaid, and shall be authorized upon filing of the certificate of the jury in the circuit court of said county, to appear before the circuit judge and make proof relative to their proportionate claims to the said burying grounds, or addition or approach thereto, or the compensation to be made therefor, as determined by said jury. And the said circuit judge shall, by decree, settle their several claims in accordance with the rights of the parties respectively, and may divide the sum awarded by said jury between the claimants as in his judgment will be equitable and right, rendering against said township a separate judgment for each of the amounts so awarded.

(208) SEC. 12. The circuit judge, judge of probate, or circuit court commissioner of any county where any money has been deposited with the county treasurer of such county, as hereinbefore provided, shall, upon the written appli-

cation of any person or persons entitled to such money, and upon receiving satisfactory evidence of the right of such applicant to the money thus deposited, make an order directing the county treasurer to pay the money thus deposited with him to said applicant; and it shall be the duty of such county treasurer, on the presentation of such order, with the receipt of the person named therein, endorsed on said order and duly acknowledged, in the same manner as conveyances of real estate are required to be acknowledged to pay the same; and such order, with the receipt of the applicant or person in whose favor the same shall be drawn, shall, in all courts and places, be presumptive evidence in favor of such county treasurer, to exonerate him from all liability to any person or persons for said money thus paid by him.

(209) Sec. 13. In case any circuit judge, circuit court commissioner, or justice of the peace, who shall issue a summons or venire for a jury, shall be unable to attend to any of the subsequent proceedings in such case, any other circuit court commissioner or justice of the peace may attend and finish said proceedings.

(210) Sec. 14. Circuit judges, circuit court commissioners, and justices of the peace, for any services rendered under the provisions of this act, shall be entitled to the same fees and compensation as for similar services in other special proceedings. Jurors, constables, and sheriffs shall be entitled to the same fees as for like services in civil cases in circuit court.

Approved June 2, 1909.

ACT NO. 293, PUBLIC ACTS OF 1909.

An Act in relation to the public health in this state.

The People of the State of Michigan enact:

(29) Section 1. The State Board of Health is hereby authorized and empowered, whenever it becomes necessary to promote the work of the State Board of Health, to appoint any one of its members a state medical inspector, to the end that the rules and regulations adopted by said board for the preservation of public health may be strictly enforced in the various parts of the state. Any member of the board selected or appointed as a medical inspector, or any other person the board may so designate to act as a medical inspector, shall have the same right of inspection and the same authority in regard to all matters affecting the public health as has been or may be conferred upon the state or local boards of health. The said State Board of Health is hereby expressly authorized to designate what diseases are dangerous communicable diseases and what diseases are contagious diseases, and it shall be the duty of every local board of health and health officer to observe such rules in relation to dangerous communicable diseases and contagious diseases as may be prescribed by the said State Board of Health.

(30) Sec. 2. Every person selected to act as medical inspector shall act under the direction of the State Board of Health and shall make a thorough and complete investigation of all nuisances, sources of sickness, epidemics of infectious or dangerous communicable diseases or contagious diseases, water supplies, the sewerage disposal systems, the sanitary conditions of public vaults, jails, schoolhouses and school grounds, and such other work as is found necessary to improve the general sanitary and hygienic condition of the state.

(31) Sec. 3. It shall be the duty of any person acting as such medical inspector after the completion of any investigation to immediately report in writing to the State Board of Health, upon such forms and in such manner as may be prescribed, a complete account of the essential facts disclosed by the investigation, together with the recommendations made and the work done to better safeguard the public health.

(32) Sec. 4. The compensation of any person selected to act as medical inspector, and the members of the State Board of Health when acting as medical inspectors, shall be determined by the State Board of Health. All actual expenses incurred by the medical inspector in the discharge of his official duties, together with his compensation, not to exceed ten dollars per diem, shall be paid from the general fund in the state treasury upon vouchers audited by the board of state auditors and approved by the State Board of Health.

(33) Sec. 5. There is hereby annually appropriated out of the general fund

in the state treasury such amount as may be necessary to enable the State Board of Health to carry out the provisions of this act. The Auditor General shall add to and incorporate in the state tax for the year nineteen hundred nine and every year thereafter, a sufficient amount to reimburse the general fund in the state treasury when collected for the amounts appropriated by the provisions of this act.

Sec. 6 repeals inconsistent acts.

Approved June 2, 1909.

ACT NO. 306, PUBLIC ACTS OF 1909.

An Act in relation to the diseases of rabies among dogs, to provide for the payment of certain damages for domestic animals infected with rabies by dogs and to provide penalties for the violations of this act.

The People of the State of Michigan enact:

(111) Section 1. It is hereby made the duty of all township boards of health to whom cases of rabies among dogs are reported to immediately investigate the same by some member or members of the board; and should such investigation show a reasonable probability that a dog is affected with the disease known as rabies, the said board of health shall immediately establish such temporary quarantine as may be necessary to prevent the spread of the disease and to make immediate complaint thereof in the manner provided in section four hereof.

(112) Sec. 2. The said board of health, when in its judgment such action is necessary to prevent the spread of the disease, shall have power to order all dogs in the township or any part thereof, restrained, confined or muzzled.

(113) Sec. 3. The order of the board of health to restrain, confine or muzzle dogs shall be operative when a copy of such order shall have been left at the usual place of residence of the owner or owners of dogs that are believed to have been exposed to the said disease, or when a copy of said order has been posted in three of the most public places in the township or part thereof to which said order applies.

(114) Sec. 4. Any member of the board of health or any resident of the township may make complaint to any justice of the peace of said township when any dog within the township is rabid, or has been bitten by or been fighting with a dog that is rabid, or has been running at large in violation of the order of the board of health. Upon such complaint it shall be the duty of the said justice of the peace to give notice to the owner of such dog or dogs to appear forthwith for the hearing of said complaint. Upon such hearing, if the said justice shall be satisfied that the said dog is rabid, has been bitten by or been fighting with a dog that is rabid, or has been running at large in violation of the said order of the board of health, he shall be authorized to make an order that such dog or dogs be killed: *Provided*, That the said justice, in his discretion, in all cases in which it does not appear at the hearing that the dog or dogs in question are rabid, may order the said dog or dogs restrained for a period of at least ninety days: *Provided further*, That in all cases in which the owner of the dog complained against cannot be ascertained, the justice may immediately order the said dog to be killed.

(115) Sec. 5. In all cases in which a dog is ordered killed the justice shall issue an order to any constable of the township directing him to forthwith kill and bury the said dog, for which service the constable shall receive a fee of one dollar to be paid by the township out of its general fund in the manner that other constable fees are paid.

(116) Sec. 6. Whenever any rabid dog shall infect any domestic animal with rabies, and said animal shall die therefrom or be ordered killed on account thereof, the owner of said animal shall be reimbursed for the said loss in the manner and out of the fund provided by act number forty-eight of the public acts of nineteen hundred one, and the amendments thereto: *Provided*, That when any domestic animal shall be infected with rabies by a dog belonging to the owner of said domestic animal, and said animal shall die from said infection or be ordered killed on account thereof, then the owner of said domestic animal shall in no case be reimbursed for said loss, as herein provided.

(117) Sec. 7. Any officer refusing or neglecting to perform any of the duties imposed upon him by any of the provisions of this act shall be deemed guilty of a misdemeanor and subject to the penalties prescribed by law in such cases.

(118) Sec. 8. Any person violating any of the provisions of this act, or of a quarantine or regulation or order to restrain, confine or muzzle dogs, duly established or issued by the board of health as provided in this act, shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be subject to a fine of not less than ten dollars nor more than one hundred dollars, or to imprisonment in the county jail for a period of not less than ten days nor more than thirty days, or both such fine and imprisonment in the discretion of the court.

Approved June 2, 1909.

ACT NO. 319, PUBLIC ACTS OF 1909.

An Act to provide for the examination, regulation, licensing and registration of nurses and for the punishment of offenders against this act.

The People of the State of Michigan enact:

(238) Section 1. The governor shall appoint by and with the advice of the senate, four residents, either male or female, three of whom shall be graduated nurses, and one who shall be a registered physician of this state, who shall with the Secretary of the State Board of Health constitute a board of registration of nurses. Such appointees shall be chosen from the actual residents of this state and, except the registered physician, from nurses who have graduated from reputable training schools, giving at least a two years' course of training, served in hospitals of good standing, and who have had five years' experience in nursing. In the event that the appointment of a successor is not made upon the expiration of the term of any member, such member of said board shall hold office until a successor is duly appointed. The governor shall fill vacancies occasioned by death or otherwise and may remove any member for the continued neglect of duties required by this act. Vacancies in said board shall be filled in accordance with the provisions of this act for the establishment of the original board, and persons appointed to fill vacancies shall hold office during the unexpired portion of the term for which their predecessors were appointed. The four persons so appointed shall be appointed in two classes as follows: Two shall be appointed to hold office for three years and two shall be appointed to hold office for six years, beginning with the first day of August, nineteen hundred nine, and until their successors are appointed, and thereafter the governor shall appoint on or before the first day of August of each third year persons qualified as aforesaid in each class to hold office for six years from the first day of August next ensuing. Within the meaning of this act, a state registered nurse is defined as one who, for hire or reward, nurses, attends and ministers to the sick or afflicted under the supervision and direction of a legally registered practitioner, and who has qualified for such calling or profession, except as hereinafter provided in section three, article four of this act, through a regular course of instruction and practice in a recognized training school for nurses connected with a hospital, sanitarium or state institution for the consumptive, insane or feeble-minded and compliance with the further provisions of this act.

(239) Sec. 2. The members of said board shall meet on the first Wednesday of November, nineteen hundred nine, at Lansing, and shall elect a president, vice president and secretary from their own number, each of whom shall hold his or her respective office for two years. This board shall adopt rules and regulations not inconsistent with this act to govern its proceedings, and shall adopt a seal of which the secretary shall have the care and custody. The secretary shall keep a record of all proceedings of the board, including a register of the names of all nurses duly registered under this act, which shall be open at all reasonable times to public scrutiny. No less than three members shall constitute a quorum of said board for the transaction of business. Said board shall hold one regular meeting in each year, and such additional meetings at such times and places as it may determine. Notices of such meetings shall be published in two newspapers of general circulation in the state and in one nursing journal at least thirty days previous to such meeting. The secretary shall give to the state treasurer a bond in the penal sum of one thousand dollars, with one or

more sufficient sureties to be approved by the governor for the faithful discharge of his or her duties.

(240) SEC. 3. On and after the first day of December, nineteen hundred nine, all men and women engaged in the practice of professional nursing and all who may wish to begin the same in the state, except as hereinafter provided, shall make application to said board to be registered and to be furnished a certificate of such registration. This registration and certificate shall be granted to such applicants as shall give satisfactory proofs of being twenty-one years of age, of good moral character and of having received the equivalent of a grammar school education. Each applicant shall comply with at least one of the following conditions: Without examination:

First. The applicant shall be registered and shall receive a certificate of registration without examination, if he or she shall present a diploma issued before December first, nineteen hundred twelve, by a training school connected with a general hospital, state hospital, sanitarium or special hospital, where a two years' course of training is required with systematic instruction in the hospitals or from one or more general hospitals of good standing, supplying a systematic training corresponding to the above standard.

Second. The applicant shall be registered and given a certificate of registration without examination, if he or she shall have a diploma from a training school connected with the general hospital, sanitarium or special hospital giving a two years' training; or prior to the year eighteen hundred ninety-five, if he or she has received one year's training in any of the aforesaid institutions under conditions satisfactory to the board and who is engaged in professional nursing at the date of the passage of this act, or has been engaged in professional nursing for five years after graduation prior to the passage of this act: *Provided*, Such application shall be made before December first, nineteen hundred eleven.

Third. The applicant shall be registered and given a certificate of registration after December first, nineteen hundred ten, who shall present a certified copy of or certificate of registration or license from another state of the Union where the requirements for registration shall be deemed by said board to be equivalent to those of this act, upon the payment of the usual fee for certificate.

With examination:

Fourth. Any applicant who has pursued as a business the vocation of nursing for a period of not less than five years prior to the passage of this act, and who presents to the board a certificate stating that he or she is competent to give efficient care to the sick under the direction of a competent physician, said certificate to be signed by one registered physician and two registered nurses, shall be entitled to take such examination before the board as may be deemed necessary to determine his or her fitness to give efficient nursing care to the sick, such application to be filed within the two years immediately following the passage of this act.

Fifth. After December first, nineteen hundred twelve, the applicant shall be registered and given a certificate of registration if he or she shall have a diploma from a training school connected with a hospital requiring a two years' course of training with systematic instruction in a general hospital, state hospital, sanitarium or special hospital in good standing, and upon passing such an examination before the board at such time and place as it may designate and in accordance with the rules prescribed by the board, which rules shall be furnished from time to time by any hospital, sanitarium or special hospital applying therefor.

(241) SEC. 4. Every applicant for registration under this act shall pay a fee of ten dollars upon filing his or her application. Upon the issuance of a certificate of registration each nurse shall cause a copy thereof to be filed with the county clerk of the county in which said applicant resides, with an affidavit of his or her identity as the person to whom the same was issued, and his or her place of residence at the time of examination and registration. He or she shall be prepared, whenever requested, to show his or her certificate of registration. The county clerk shall charge fifty cents for registering such license.

(242) SEC. 5. It shall be the duty of the secretary of said board to file with the secretary of state at least quarterly a list of all certificates of registration issued by said board, with the names and residences of the persons to whom such certificates have been issued.

(243) SEC. 6. All moneys received by said board shall be paid to the state

treasurer quarterly, and shall be credited to the general fund of the state, and a receipt for the same shall be filed by the secretary of said board in the office of the auditor general. The incidental and the traveling expenses of said board shall be paid from such fund only. The compensation of all members of the board shall be at the rate of five dollars a day, together with all legitimate expenses, which shall be paid from the aforesaid fund, for each day actually engaged in attending meetings of said board, and in no case shall any more be paid than was actually expended. The secretary shall receive extra compensation at the rate of one hundred dollars per annum, payable quarterly. A statement of the incidental and traveling expenses of the members of the board shall be approved by said board and sent to the auditor general of the state, who shall draw his warrant upon the state treasurer for the amounts due as in case of other bills and accounts under the provisions of law: *Provided*, That the amount so paid shall not exceed the amount received by the state treasurer from said board in fees, as herein specified, and as much of said receipts as may be necessary is hereby appropriated for the compensation and expenses of said board as aforesaid.

(244) Sec. 7. Any person who shall have complied with the provisions of this act and received a certificate of registration shall be styled and known as a "Registered Nurse," and be entitled to append the letters "R. N." to his or her name.

(245) Sec. 8. Any person properly registered under the provisions of this act shall, before entering any service in that capacity, furnish a certificate of good health from a properly registered physician, showing that he or she is free from tuberculosis or any specific or infectious disease; said certificate to be renewed semi-annually.

(246) Sec. 9. Any person who shall, after the passage of this act, practice professional nursing as a registered nurse without first complying with the provisions of this act, shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be punished by a fine of not more than two hundred dollars or by imprisonment in the county jail for a period of not more than ninety days or by both such fine and imprisonment for each offense.

(247) Sec. 10. When any person shall append the letters "R. N." or shall use any other letter, figures or sign to indicate that he or she is a registered nurse, it shall be prima facie evidence of practicing professional nursing as a registered nurse within the meaning of this act.

(248) Sec. 11. This act shall not apply to the gratuitous nursing of the sick by friends or by members of the family, nor to any person nursing the sick for hire, but who shall not in any way assume to be a registered nurse. It shall not be construed to interfere in any way with religious communities having charge of hospitals or those who care for the sick in their own homes.

(249) Sec. 12. Said board shall have the power to revoke any certificate issued by said board in accordance with the provisions of this act and for the following causes: Gross incompetency, violations of the provisions of this act, dishonesty, habitual intemperance or any act derogatory to the morals or standing of the profession of nursing, as may be determined by the board: *Provided*, That such revocation shall only be made upon specific charges in writing, under oath, filed with the secretary, and by a majority vote of the whole board, a certified copy of such charges and thirty days' notice of the hearing of the same having been personally served upon the holder of such certificate. Said board shall be authorized to furnish a list of the names and addresses of those whose certificates have been revoked to the board of examiners of other states upon the written request of such board.

Sec. 13 repeals contravening acts.

Approved June 2, 1909.

MICHIGAN STATE SANATORIUM FOR THE TREATMENT OF INCIPIENT CASES OF TUBERCULOSIS.

Through the courtesy of Miss N. D. Lansing, Secretary of the State Sanatorium, at Howell, this Department has been furnished interesting data relative to the progression of that institution during the fiscal year 1909.

Owing to failing health, Dr. R. L. Kennedy, the first medical superintendent of the Sanatorium, was compelled to leave the institution, and April 3, 1909, his resignation was accepted by the Board of Trustees, a step which had been delayed since the preceding November, in the hope that he might be sufficiently restored to health to resume the work. Dr. Earl M. McCoy is the present acting superintendent.

By an act, passed by the legislature in February, 1909, an appropriation of $7,000 is provided for current expenses in 1910, and $8,000 for the same purpose in 1911 for the sanatorium. This act also provides for an appropriation of $14,100 in 1910 for the construction of six shacks, permanent water system and purchasing of farming implements; and the sum of $7,500 is appropriated in 1911 for steam laundry equipment, cement walks, fences, a stable, purchase of milch cows, dishes, furniture, etc.

The Board of Trustees has proceeded to carry out the provisions of the enactment, and by the time the several moneys are available, the additions, extensions and improvements provided for will be under way.

The funds provided for maintenance are not increased, by this act, in accordance with the increased capacity for inmates, therefore the management is compelled to practice the greatest economy, so far as appliances and equipment are concerned. It is anticipated that provision will be made for this deficiency when the needs become more generally known.

Since making their last report, for 1908, the dining room in the main building has been completed, its capacity now being 125 seats at table, and it is thought that no other changes will be necessary to meet future demands in this room. A temporary infirmary, with a capacity of eight patients, has also been added to the main building. The original plans contemplate an infirmary in keeping with the structural features of the main building, and when the latter is added the temporary infirmary can be moved to another part of the grounds and converted into a shack.

When the sanatorium is completed, according to the original intent, it will accommodate about one hundred patients. As cases come and go, it is impossible to hold the number uniform, the number of inmates being sometimes below the normal capacity, and then again above the normal. Considering the very great number of cases that are eligible to admission, only an insignificant fraction of them can be admitted to the institution at any one time.

As the sanatorium teaches the patients how to care for themselves, then the patients, in turn, must become teachers. They will, as a rule, return to their respective communities and tell others what they have learned about rest, diet, open air, exercise, personal hygiene and all other essentials of the "cure" as they took it. In this way, it is anticipated that, before long, more people will be indirectly than directly benefited.

The grounds surrounding the building have been laid out in artistic designs, and many thousand seedling trees have been planted thereon, which, when grown, will afford great comfort to the patients.

The large farm in connection with the sanatorium needs to be brought into as good a state of cultivation as the quality of the soil will permit. Under the supervision of an expert from the State Agricultural College, a strawberry bed has been planted, and the ground prepared for the planting of an orchard of various kinds of fruit. The farm buildings are wholly inadequate to meet the needs of the institution.

The staff of the sanatorium consists of a medical superintendent; a secretary, who has charge of the correspondence and who, also, does the work of an accountant; a matron who superintends the housekeeping and culinary departments and two trained nurses who look after the personal needs of the patients. The outside service consists of a farmer and such assistants as required.

Patients are not admitted to the institution for a longer period than six months. In many instances the patients should remain longer than that period, and when such is the case, they can provide themselves with individual shack-tents, at their own expense, and continue under the observation of the staff and get their meals at the dining-room at the regular rate paid by other patients, which is seven dollars per week.

As only incipient cases of tuberculosis are treated at this institution, and as there might be a question in the minds of some physicians as to when a case is considered in its first stage by the medical staff of the sanatorium, we print below their definition of the various stages:

INCIPIENT (FAVORABLE) STAGE OF TUBERCULOSIS.

Slight initial lesion in the form of infiltration, limited to the apex or a small part of one lobe.

No tuberculous complications. Slight or no constitutional symptoms (particularly including gastric or intestinal disturbances or rapid loss of weight).

Slight or no elevation of temperature or acceleration of pulse at any time during the twenty-four hours, especially after rest.

Expectoration usually small in amount or absent.

Tubercle bacilli may be present or absent.

MODERATELY ADVANCED STAGE OF TUBERCULOSIS.

No marked impairment of function either local or constitutional.

Localized consolidation moderate in extent with little or no evidence of destruction of tissue.

Or disseminated fibroid deposits.

No serious complications.

FAR ADVANCED STAGE OF TUBERCULOSIS.

Marked impairment of function, local and constitutional.
Localized consolidation intense.
Or disseminated areas of softening.
Or serious complications.

HISTORY OF DISCHARGED PATIENTS.

Following is some interesting data relative to the persons who were trated for tuberculosis at the Sanatorium, during the fiscal year ending June 30, 1909:

	Males.	Females.	Total.
Patients in Sanatorium July 1, 1908	18	16	34
Number admitted within year	51	62	113
Number discharged within year	47	56	103
Number remaining in Sanatorium June 30, 1909	23	21	44

Residence (county), and the number from each, in which the discharged patients resided.

Residence (county).	Males.	Females.	Total.
Alger		1	1
Barry	1		1
Bay		1	1
Cheboygan		1	1
Clinton		2	2
Calhoun	1		1
Eaton	2		2
Genesee	3		3
Gratiot	3	1	4
Ingham	3	4	7
Ionia	2	2	4
Isabella	1		1
Jackson	2	1	3
Kalamazoo		3	3
Kent	2	5	7
Lake	1	1	2
Livingston	7	3	10
Manistee	1	1	2
Mecosta		1	1
Midland	1		1
Monroe		2	2
Osceola		1	1
Saginaw	1	2	3
Shiawassee	1	1	2
St. Clair		2	2
Van Buren	1		1
Washtenaw		3	3
Wayne	14	18	32
Total	47	56	103

Occupation of the discharged patients.

Occupations.	Males	Females.	Totals.
Traveling salesman	4	....	4
Clerks	3	1	4
Housekeeper	....	34	34
Student	4	4	8
Teacher	....	3	3
Farmer	11	....	11
Tailoress	....	1	1
Bookkeeper	1	7	8
Mail carrier	1	....	1
Cigar maker	....	1	1
Printer	2	....	2
Silkwarper	1	....	1
Street car conductor	1	....	1
Carriage trimmer	1	....	1
Sailor	2	....	2
Manufacturers	2	....	2
Carpenter	1	....	1
Mill hand	1	....	1
Brass finisher	1	....	1
Book binder	....	1	1
Insurance agent	1	....	1
Pattern maker	1	....	1
Laborer	1	....	1
Builder	1	....	1
Musician	....	1	1
Jeweler	1	....	1
Tanner	1	....	1
Sheriff	1	....	1
Factory girl	....	1	1
Mechanical engineer	1	....	1
Steam fitter	1	....	1
Machinist	1	....	1
Barber	1	....	1
No occupation	....	2	2
Total	47	56	103

Ages of the discharged patients.

Ages.*	Males.	Females.	Total.
16 to 20 years	5	10	15
20 to 30 years	20	24	44
30 to 40 years	16	18	34
40 to 50 years	6	4	10
Total	47	56	103

*Average age male 37.5; average age female 26.0

Civil conditions of discharged patients.

Civil Conditions.	Males.	Females.	Total.
Married	18	22	40
Single	29	32	61
Widowed	....	2	2
Total	47	56	103

Nativity of the discharged patients.

Nativity.	Males.	Females.	Total.
American	42	48	90
German	1	4	5
Canadian	2	2	4
Swedish	....	1	1
Holland	....	1	1
Irish	1	....	1
Polish	1	....	1
Total	47	56	103

As the following history of patients is recorded only in those instances where the patient has been a resident of the sanatorium over one month, and there being eleven who were discharged before the expiration of that time, the following pertains to only 92 of the discharged patients:

Presumable duration of disease before admission.

Presumable Duration.	Males.	Females.	Total.
1 to 3 months	3	2	5
3 to 6 months	10	5	15
6 to 12 months	9	11	20
1 to 2 years	12	15	27
2 to 5 years	9	16	25
Total	43	49	92

Physical condition on admission.

Physical Condition.	Males.	Females.	Total.
Incipient	9	21	30
Moderately advanced	30	22	52
Far advanced	4	6	10
Total	43	49	92

Physical condition on discharge.

Physical Condition.	Males.	Females.	Total.
Apparently cured	5	15	20
Arrested	10	8	18
Improved	15	12	27
Unimproved	12	13	25
Died	1	1	2
Total	43	49	92

Turban classification.

	Apparent Cure.		Arrested.		Improved.		Unimproved.		Died.		Total.	
	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	Mal	Females.
Stage I	5	13	4	4	1	8	3	1	0	0	13	26
Stage II	0	1	5	4	12	2	5	10	1	0	23	17
Stage III	1	0	0	1	2	2	4	2	0	1	7	8
Total	6	14	9	9	15	12	12	13	1	1	43	49
	20		18		27		25		2		92	

The average residence of the discharged patients at the Sanitorium was 19.8 weeks.

The average gain in weight of 81 patients during treatment was 10.1 pounds, and the average loss of weight of 11 patients was 6.6 pounds. The greatest gain in weight of a single patient in 26 weeks was 32 pounds, while the greatest loss in weight in 18 5-7 weeks was 12 pounds.

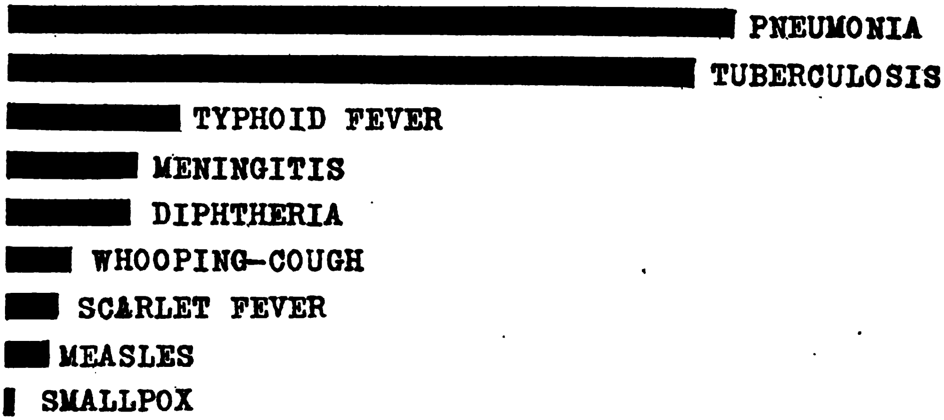
PART II.

COMMUNICABLE DISEASES IN MICHIGAN DURING THE YEAR ENDING DECEMBER 31, 1908, AND PRECEDING YEARS.

INTRODUCTION.

This article is the twenty-eighth in a series upon the same general subject, begun in 1882. It presents a summary of the compilations of the reports received from health officers relative to certain communicable diseases in Michigan during the year 1908, together with a review of some of the information obtained from similar compilations in preceding years. The most dangerous diseases are treated in detail in the order of their importance as causes of deaths, as shown by the diagram below, (compiled from the Monthly Bulletin of Vital Statistics):

DEATHS IN MICHIGAN 11 YEARS, 1898–1908.



SOME OF THE PURPOSES OF THIS COMPILATION.

In the law establishing the State Board of Health, the Secretary of the Board is required to collect information concerning vital statistics and knowledge respecting diseases, and to disseminate such information among the people. In compliance with this requirement, it is the custom to collect, compile, tabulate and publish information relative to the causes, and methods of prevention and restriction, of the dangerous communicable diseases, under the following general heads: The General Prevalence of each disease; The Geographical Distribution of each disease; The Comparative Prevalence of each disease in Urban and Rural localities; The Reported Sources of Contagium of each disease; and The Restrictive and Preventive Measures in each disease. In the case of pneumonia, an effort is being made to learn the Period of Incubation of the disease. In the case of pneumonia, tuberculosis and meningitis, an effort is being made to show the Influence of Age and Sex, the Duration of Sickness, and the Seasonal Prevalence of each disease.

METHODS OF COMPILATION.

With the exception of pneumonia, tuberculosis, meningitis and typhoid fever, which have been studied by individual cases, the diseases have been compiled by *households,* instead of by *outbreaks* as in the past.

A *household* report is intended to include all the cases which occur in a house, or other place of abode, at or about the same time. When a period of over sixty days has elapsed since the last death or recovery in a household, should the disease reappear in the household and the source of contagium cannot be traced to the previous cases, a separate compilation is made of the subsequent cases. It will be seen, therefore, that it is quite possible for a particular disease to appear in the same household several times during any year and to be counted as one or as several households in the compilation, according to the circumstances attending the outbreaks.

GENERAL PLAN OF THE REPORTS.

Upon the receipt of information at this office that tuberculosis, diphtheria, typhoid fever, scarlet fever, measles, whooping-cough, meningitis, smallpox, German measles (rötheln), rabies or glanders, was present, or had recently been present, in any locality in the State, a letter was sent to the health officer, or, in his absence to the president of the board of health, mentioning the reported existence of the disease within his jurisdiction, indicating his duties and powers, and the proper measures to be taken in restricting the disease, transmitting documents of instruction relative to the prevention and restriction of the disease for distribution among the neighbors of families in which the disease is present, and asking for reports relative to the methods employed for the restriction of the disease, the results of efforts for suppressing it, and the number of cases and deaths in each outbreak. With this letter, in each instance, except in the case of rabies and glanders, there was sent a sufficient number of blanks for the preliminary and final reports.

The information contained in the several reports, together with other correspondence relative to outbreaks of such diseases, are the basis on which the statements made in this article are founded.

PNEUMONIA IN MICHIGAN IN 1908 AND PRECEDING YEARS.

As shown by Table 1, the prevalence of pneumonia was noticeably less than in any year since this Department began the compilation of pneumonia in 1904. While the prevalence of pneumonia seems to be less in 1908 than in preceding years, still we believe, and with good reason, that a large number of non-fatal cases are not reported to local health officials, and by them to this Department. This is particularly true in the case of the more densely populated localities, from which as a rule, only the fatal cases are reported, and where pneumonia is generally the most prevalent. As it usually happens that this Department gets its first information of cases of pneumonia from the death certificates returned to the Secretary of State's Department, by the time this Department is able to notify the local health officials of the occurrence of the cases, it is too late for them to take the necessary measures for the restriction and prevention of the disease.

Pending a more general recognition of the fact of the communicability of pneumonia, local boards of health should require from physicians and householders reports relative to every case of this disease in their jurisdictions, and should take all precautions necessary for the restriction and prevention of the disease. In this connection, we quote, in part, from a communication sent by the Secretary of this Department to a health officer of one of the townships of the State, who, it seems, considered it unnecessary to enforce the restrictive and preventive measures in pneumonia:

"Strictly speaking, this Department would, perhaps, agree with you that pneumonia is not *contagious* in character; but that the disease is communicable, there is no question. * * * It is the duty of this Department to employ recognized facts in regard to this disease, and to give the public the benefit of any doubt by guarding the public health, and that the great number of deaths now occurring from pneumonia can be greatly reduced if restrictive measures be faithfully carried out."

TABLE 1.—*The prevalence of pneumonia, in Michigan, in each of the five years, 1904-1908.*

Years.	Population.*	Number of cases.†	Number of deaths.	Deaths per 100,000 of the population.
1904	2,530,016	3,790	2,903	114.7
1905	2,557,275	3,227	2,636	103.1
1906	2,584,533	3,387	2,839	109.8
1907	2,611,792	3,976	3,159	121.0
1908	2,639,050	3,177	2,502	94.8
Annual averages	2,584,533	3,511	2,808	108.6

* Estimated for intercensal years.

† From a large number of localities only the fatal cases were reported, so that the figures in this column do not represent the number of cases that actually occurred.

GEOGRAPHICAL DISTRIBUTION.

In the consideration of this phase of the study of pneumonia, the State is divided into eleven geographical divisions,* the counties in each of which would be likely to have somewhat similar climatic conditions. Judging from the death rates of the several divisions, shown in Table 2, pneumonia was most prevalent in the Southeastern Division and least prevalent in the Southwestern Division. Arranging the divisions in the order of greatest death rates per 100,000 inhabitants, we have the Southeastern (153.6), Upper Peninsula (110.0), Western (104.2), Bay and Eastern (99.7), Southern Central (99.1), Central (96.2), Northern Central (95.3), Northwestern (94.6), Northeastern (89.0), Northern (87.1), and Southwestern (78.5). Compared with the average death rate for the State as a whole (108.6), the counties in which the disease was unusually prevalent during the five years, 1904-1908, are—Roscommon (176.2), Wayne (166.3) and Tuscola (141.7).

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* The boundaries of the several divisions may be seen by reference to the annual report of this Board for 1886, pages 201 and 217.

TABLE 2.—*The geographical distribution of pneumonia, in Michigan, in the five years, 1904-1908, as indicated by the average number of cases and deaths, and the average deaths per 100,000 persons living, in each geographical division shown in the table.*

Geographical Divisions.	Average.			
	Population.*	Cases.†	Deaths.	Death rates.
UPPER PENINSULAR DIVISION..	282,609	413	311	110.0
Alger county	6,869	9	9	131.0
Baraga county	5,496	4	4	72.8
Chippewa county	22,519	30	25	111.0
Delta county	28,611	40	38	132.8
Dickinson county	19,459	18	17	87.4
Gogebic county	17,577	17	17	96.7
Houghton county	72,906	132	93	127.6
Iron county	8,892	12	10	112.5
Keweenaw county	5,211	14	5	96.0
Luce county	4,332	5	5	115.4
Mackinac county	8,519	7	6	70.4
Marquette county	39,395	69	41	104.1
Menominee county	26,174	29	27	103.2
Ontonagon county	7,651	13	6	78.4
Schoolcraft county	8,998	14	8	88.9
NORTHWESTERN DIVISION	94,102	139	89	94.6
Benzie county	11,343	13	11	97.0
Grand Traverse county	24,564	31	22	89.6
Leelanau county	10,961	14	11	100.4
Manistee county	26,831	54	27	100.6
Wexford county	20,403	27	18	88.2
NORTHERN DIVISION	89,563	106	78	87.1
Antrim county..	15,198	18	17	111.9
Charlevoix county	17,439	21	12	68.8
Cheboygan county	18,126	21	16	88.3
Crawford county	4,310	6	4	92.8
Emmet county	18,873	23	17	90.1
Kalkaska county	7,846	7	5	63.7
Otsego county	7,771	10	7	90.1
NORTHEASTERN DIVISION	66,312	71	59	89.0
Alcona county	7,680	6	4	52.1
Alpena county	20,495	21	20	97.6
Iosco county	10,687	9	9	84.2
Montmorency county	3,656	6	4	109.4
Ogemaw county	9,799	14	12	122.5
Oscoda county	2,098	5	2	95.3
Presque Isle county	11,897	10	8	67.2
WESTERN DIVISION	285,920	357	298	104.2
Kent county	142,875	182	162	113.4
Lake county	5,020	4	3	59.8
Mason county	19,970	29	23	115.2
Muskegon county	37,542	50	44	117.2
Newaygo county	18,795	19	12	63.8
Oceana county	18,253	23	20	109.6
Ottawa county	43,465	50	34	78.2
NORTHERN CENTRAL DIVISION	110,177	158	105	95.3
Clare county	9,604	13	6	62.5
Gladwin county	9,620	8	7	72.8
Isabella county	24,767	49	24	96.9
Mecosta county	19,977	28	23	115.1
Midland county	14,735	15	13	88.2
Missaukee county	10,745	16	14	130.3
Osceola county	19,026	23	15	78.8
Roscommon county	1,703	6	3	176.2

* † These footnotes are below Table 1, on a preceding page.

TABLE 2.—CONCLUDED.

Geographical Divisions.	Average.			
	Population.*	Cases.†	Deaths.	Death rates.
BAY AND EASTERN DIVISION	350,945	394	350	99.7
Arenac county	10,366	9	9	86.8
Bay county	63,983	78	70	109.4
Huron county	35,336	32	29	82.1
Lapeer county	26,754	45	31	115.9
Saginaw county	87,896	88	79	89.9
Sanilac county	34,773	33	27	77.6
St. Clair county	55,840	67	54	96.7
Tuscola county	35,997	42	51	141.7
CENTRAL DIVISION	316,902	407	305	96.2
Barry county	21,780	28	21	96.4
Clinton county	25,244	32	20	79.2
Eaton county	30,225	43	33	109.2
Genesee county	43,228	65	54	124.9
Gratiot county	30,860	39	31	100.5
Ingham county	45,502	53	37	81.3
Ionia county	34,776	44	35	100.6
Livingston county	18,141	24	17	93.7
Montcalm county	33,513	37	32	95.5
Shiawassee county	33,633	42	25	74.3
SOUTHWESTERN DIVISION	143,937	149	113	78.5
Allegan county	39,016	37	30	76.9
Berrien county	49,503	45	34	68.7
Cass county	19,607	24	18	91.8
Van Buren county	35,811	43	31	86.6
SOUTHERN CENTRAL DIVISION	327,984	496	325	99.1
Branch county	25,690	25	19	74.0
Calhoun county	54,787	96	60	109.5
Hillsdale county	29,823	32	25	83.8
Jackson county	46,572	101	52	111.7
Kalamazoo county	52,488	112	63	120.0
Lenawee county	49,443	55	43	87.0
St. Joseph county	22,898	23	21	91.7
Washtenaw county	46,283	52	42	90.7
SOUTHEASTERN DIVISION	518,092	822	796	152.6
Macomb county	33,020	35	29	87.8
Monroe county	33,005	43	38	115.1
Oakland county	46,223	66	54	116.8
Wayne county	405,844	678	675	166.3

* † These footnotes are below Table 1, on a preceding page.

THE PREVALENCE OF PNEUMONIA IN URBAN AND RURAL LOCALITIES.

Of the 1,658 incorporated localities in Michigan in 1908, 875, or about 53 per cent, were, at some time during the year, infected with pneumonia. These figures show a decrease of about 15 per cent in the number of infected localities, as compared with 1907.

To determine what influence, if any, density of population has on the prevalence of pneumonia, the cities and villages have been divided into the five groups shown in Table 3.

It will be seen that the death rate from pneumonia was very much higher in cities having over 50,000 population, and the lowest in cities and villages having populations less than 5,000, which fact would indicate that the density of population has an influence on the prevalence of this disease.

By Table 3A, it may be seen that, in 1908, the urban localities which showed much higher death rates from pneumonia than the death rate for this disease for the entire State for that year were: Bay City, Calumet township, Detroit, Escanaba, Holland, Ishpeming, Menominee, Negaunee, Norway, Pontiac and Port Huron.

The localities shown in Table 3A, in which the death rates from pneumonia were much lower in 1908 than the rate for the entire State for that year were: Adrian, Ann Arbor, Benton Harbor, Cadillac, Cheboygan, Grand Haven, Ionia, Iron Mountain, Lansing, Laurium, Mt. Clemens, Owosso, St. Joseph and Ypsilanti.

The localities, shown in Table 3A, which showed much higher death rates from pneumonia in 1908 than the average for such localities in the year 1904-7 were: Escanaba, Holland, Ironwood, Ishpeming, Mt. Pleasant, Negaunee and Traverse City.

The localities shown in Table 3A, which showed much lower death rates from pneumonia in 1908 than the average for such localities in the year 1904-7: Adrian, Albion, Ann Arbor, Benton Harbor, Big Rapids, Cadillac, Charlotte, Cheboygan, Flint, Grand Rapids, Hancock, Ionia, Iron Mountain, Kalamazoo, Lansing, Laurium, Ludington, Manistique, Mt. Clemens, Muskegon, Owosso, St. Joseph, Saulte Ste. Marie, Wyandotte and Ypsilanti.

TABLE 3.—*The prevalence of pneumonia in urban and rural localities, in Michigan, in 1908.*

Localities—Grouped according to density of population.	Population.*	Health jurisdictions.			Cases.†	Deaths.	Death rates per 100,000 of the population.
		Total.	Infected.				
			Number.	Per cent of all jurisdictions.			
Cities over 50,000	512,905	3	3	100	726	729	142.1
Cities from 25,000 to 50,000	126,978	4	4	100	209	137	107.9
Cities from 10,000 to 25,000, and Calumet Twp. (18,261)	233,222	16	16	100	365	234	100.3
Cities and villages from 5,000 to 10,000	188,759	28	28	100	265	167	88.5
Cities and villages under 5,000‡	354,646	329	165	50	362	268	75.6
Total urban	1,416,510	380	216	57	1,927	1,535	108.4
Balance of localities—principally townships§	1,222,540	1,278	659	51	1,250	967	79.1

* † These footnotes are below Table 1, on a preceding page.

‡ Exclusive of fifty-two cities and villages, for which the population in 1908 cannot be correctly estimated.

§ Includes the fifty-two cities and villages mentioned in the preceding paragraph, but does not include Calumet township, which, for the purpose of this study, is included in the third group of urban localities, which have corresponding populations.

TABLE 3A.—*The deaths from pneumonia in 1908, and preceding years, in each of the principal localities included in the first four groups in Table 3.*

Localities.	1908.			Average, 1904-1907.		
	Population.*	Deaths.	Deaths per 100,000 inhabitants.	Population.*	Deaths.	Deaths per 100,000 inhabitants.
Adrian	11,706	8	68.3	11,065	10	90.4
Albion	5,367	5	93.2	5,102	7	137.2
Alpena	12,998	11	84.6	12,625	12	95.0
Ann Arbor	14,689	8	54.5	14,631	14	95.7
Battle Creek	25,863	26	100.5	23,582	29	123.0
Bay City	40,535	53	130.8	37,352	†46	123.2
Benton Harbor	6,842	3	43.8	6,755	4	59.2
Big Rapids	5,018	5	99.6	4,915	8	162.8
Cadillac	7,789	4	51.4	7,229	8	110.7
Calumet township	18,261	22	120.5	17,702	19	107.3
Charlotte	5,360	5	93.3	4,964	7	141.0
Cheboygan	6,971	4	57.4	6,821	7	102.6
Coldwater	6,234	5	80.2	6,229	5	80.3
Detroit	358,159	590	164.7	333,504	585	175.4
Escanaba	12,647	27	213.5	11,679	20	171.2
Flint	16,665	17	102.0	15,552	22	141.5
Grand Haven	5,735	4	61.0	5,425	4	73.7
Grand Rapids	103,871	87	83.8	98,776	119	120.5
Hancock	8,024	7	87.2	6,782	14	206.4
Hillsdale	5,467	5	91.5	5,056	4	79.1
Holland	10,142	12	118.3	9,407	5	53.2
Houghton	5,333	5	93.8	4,715	4	84.8
Ionia	5,235	3	57.3	5,227	4	76.5
Iron Mountain	7,928	5	63.1	8,339	10	119.9
Ironwood	10,333	10	96.8	10,137	7	69.1
Ishpeming	9,991	24	240.2	11,011	13	118.1
Jackson	25,420	26	102.3	25,345	30	118.4
Kalamazoo	35,160	32	91.0	31,799	42	132.1
Lansing	24,067	15	62.3	21,698	18	83.0
Laurium	9,664	6	62.1	8,407	8	95.2
Ludington	7,352	7	95.2	7,294	10	137.1
Manistee	11,156	13	116.5	12,126	12	99.0
Manistique	5,066	4	79.0	4,773	5	104.8
Marquette	11,272	11	97.6	10,893	12	110.2
Menominee	9,374	16	170.7	10,451	15	143.5
Monroe	7,213	7	97.0	6,535	8	122.4
Mt. Clemens	7,640	5	65.4	7,308	10	136.8
Mt. Pleasant	5,306	6	113.1	4,793	3	62.6
Muskegon	20,976	16	76.3	20,927	32	152.9
Negaunee	6,659	8	120.1	6,746	4	59.3
Norway	5,558	7	125.9	5,125	6	117.1
Owosso	9,594	3	31.3	9,314	6	64.4
Petoskey	5,087	4	78.6	5,149	5	97.1
Pontiac	11,999	15	125.0	11,302	16	141.6
Port Huron	20,898	25	119.6	20,355	22	108.1
Saginaw	50,875	52	102.2	48,210	50	103.7
St. Joseph	5,489	1	18.2	5,385	4	74.3
Sault Ste. Marie	12,346	11	89.1	11,781	15	127.3
Traverse City	13,067	13	99.5	11,924	9	75.5
Wyandotte	5,667	6	105.9	5,516	12	217 5
Ypsilanti	7,796	3	38.5	7,666	7	91.3

* Estimated for intercensal years.

† Does not include West Bay City for 1904, which was consolidated with Bay City in 1905.

SEASONAL PREVALENCE.

Judging from the average number of persons who were taken sick in each month in the five years, 1904-1908, shown in Table 4, pneumonia was most prevalent in the month of February, and least prevalent in the month of August.

By the Secretary of State's Vital Statistics of Michigan, it appears that during the eleven years, 1898-1908, the greatest number of deaths from pneumonia occurred in the months of February and March, and the least number in August.

TABLE 4.—*The seasonal prevalence of pneumonia, in Michigan, as indicated by the average number of persons taken sick in each month in the five years, 1904-1908, and by the average number of deaths, from this disease, in each month in the eleven years, 1898-1908.*

Years.		Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1904-1908	Average number of persons taken sick in each month*	475	498	401	345	279	111	70	54	89	138	222	289
1898-1908	Average number of deaths in each month†.........	347	393	378	311	239	118	70	59	77	116	177	248

* The months in which some of the cases began were not reported.

† The averages for the years 1898-1908, are compiled from the Secretary of State's Vital Statistics of Michigan, and for the five years 1904-1908, from the Michigan Monthly Bulletin of Vital Statistics.

INFLUENCE OF AGE AND SEX.

The ages of those taken sick with pneumonia in the five years, 1904-1908, were stated in 17,137 instances.

In the cases of those who died from pneumonia, the ages were stated in 13,847 instances, and of this number, 24 per cent were under one year; 37 per cent under 5 years; nearly 10 per cent between the ages of 5 and 24 years; 16 per cent between the ages of 25 and 49 years; 25 per cent between the ages of 50 and 74 years; and nearly 12 per cent 75 years and over.

The number and per cent of cases and deaths, by one-year periods from 0 to 5 years, and by five-year periods from 5 to 75 years, are contained in Table 5.

The average age of non-fatal cases was for males 24.7 years, and for females 27.7 years.

The average age of fatal cases was for males 31.6 years, and for females 34.3 years.

Thirty-eight per cent of the males and 36 per cent of the females who died, and 17 per cent of the males and 18 per cent of the females who recovered, were under five years of age.

Ten per cent of the males and 14 per cent of the females who died, and 2 per cent of the males and 3 per cent of the females who recovered, were over 74 years of age.

Up to the fourth year, and between the ages of 15 and 69 years, inclusive, the fatality was slightly higher in the males than in the females. At nearly all ages the recoveries were more numerous among males than females.

TABLE 5.—*The influence of age and sex in pneumonia, as indicated by the number of those of known ages, who died or recovered from this disease in the five years, 1904-1908. Arranged, by sex, in age periods of one year for those of from one to five years; in five year periods for those of from five to seventy-five years; and in one group for those of seventy-five years and over.*

Age periods.	Died.						Recovered.					
	Total deaths.			Per cent of deaths.			Total recoveries.			Per cent of recoveries.		
	Males.	Females.	Both sexes.	Males.	Females.	Both sexes.	Males.	Females.	Both sexes.	Males.	Females.	Both sexes.
0-1 years	1,937	1,388	3,325	13.99	10.02	24.01	74	52	126	2.25	1.58	3.83
1-2 years	585	499	1,084	4.22	3.60	7.82	59	62	121	1.79	1.89	3.68
2-3 years	199	177	376	1.43	1.28	2.71	62	54	116	1.89	1.64	3.53
3-4 years	111	109	220	.80	.79	1.59	68	51	119	2.07	1.55	3.62
4-5 years	67	72	139	.48	.52	1.00	53	37	90	1.61	1.13	2.74
Under 5 years	2,899	2,245	5,144	20.94	16.21	37.15	316	256	572	9.60	7.78	17.38
5-9 years	175	167	342	1.26	1.21	2.47	255	202	457	7.75	6.14	13.89
10-14 years	90	113	203	.65	.82	1.47	161	132	293	4.89	4.01	8.90
15-19 years	199	148	347	1.44	1.07	2.51	223	96	319	6.78	2.92	9.70
20-24 years	219	164	383	1.58	1.19	2.77	152	72	224	4.62	2.19	6.81
25-29 years	192	172	364	1.39	1.24	2.63	110	67	177	3.34	2.04	5.38
30-34 years	256	181	437	1.85	1.31	3.16	94	69	163	2.86	2.10	4.96
35-39 years	256	196	452	1.85	1.41	3.26	97	66	163	2.95	2.00	4.95
40-44 years	329	169	498	2.38	1.22	3.60	92	67	159	2.79	2.04	4.83
45-49 years	329	196	525	2.38	1.41	3.79	84	80	164	2.55	2.43	4.98
50-54 years	318	192	510	2.30	1.39	3.69	80	56	136	2.43	1.70	4.13
55-59 years	352	259	611	2.54	1.87	4.41	47	47	94	1.43	1.43	2.86
60-64 years	388	354	742	2.80	2.56	5.36	51	57	108	1.55	1.73	3.28
65-69 years	415	401	816	3.00	2.89	5.89	35	53	88	1.06	1.61	2.67
70-74 years	422	425	847	3.05	3.07	6.12	46	50	96	1.40	1.52	2.92
75 years and over	750	876	1,626	5.42	6.32	11.74	29	48	77	.88	1.46	2.34
All ages	7,589	6,258	13,847	54.81	45.19	100.00	1,872	1,418	3,290	56.89	43.11	100.00

DURATION OF FATAL AND NON-FATAL CASES.

The average duration of fatal cases was for males 8.3 days, and for females 8.4 days.

The average duration of non-fatal cases was for males 18.3 days, and for females 18.8 days.

Of the fatal cases, the greatest number of deaths, both male and female, occurred between the first and eleventh days; the next greatest number before the sixteenth day, and the next, before the twenty-first day.

Of the non-fatal cases, the greatest number of recoveries, both male and female, took place between the tenth and twenty-first days.

The per cent of deaths and recoveries, both male and female, in five day periods, is shown in Table 6.

PREDISPOSING INFLUENCES.

In reply to the question, "What sickness or other predisposing influence preceded this case?" 2,904 cases were reported as having followed a cold; 830 cases following influenza; 459 cases following bronchitis, and 368 cases following exposure to inclement weather.

These, and other predisposing influences, are shown in Table 7, which may well be studied in connection with Table 8.

REPORTED SOURCES OF CONTAGIUM.

Owing to the fact that great difficulty is experienced in tracing cases of pneumonia to their source, this information is necessarily very meagre, and probably, unreliable, therefore the compilation of the source of contagium, in this disease, was discontinued in 1908. Table 8, which contains the information gathered during the period of four years, 1904-7, is reprinted for the benefit of those who wish to make a study of the subject in connection with Table 7.

PERIOD OF INCUBATION.

By reason of the difficulty experienced in locating individual sources of contagium and, by this means, the time of exposure to pneumonia, the period of incubation is not easy to determine. As indicating the probable average period of incubation in the five years, 1904-1908, it may be stated that, in the majority of instances, the time which elapsed between certain cases and recent previous cases in the same households was from one to eight days, the maximum number of cases having occurred on the seventh day.

The period of time which elapsed between the occurrence of three hundred and forty-three cases of pneumonia and previous cases in the same households, in the five years, 1904-1908, is shown in Table 9. The table may also be of service in studying the questions of *communicability in* pneumonia, and the *susceptibility,* to future attacks, of persons who have once had the disease.

TABLE 6.—*The duration of sickness in fatal and non-fatal cases of pneumonia, of* KNOWN DURATION, *during the five years, 1904-1908. Arranged by sex, in five day periods.*

Duration periods.	Fatal cases.						Non-fatal cases.					
	Number.			Per cent.			Number.			Per cent.		
	Males.	Females.	Both sexes.	Males.	Females.	Both sexes.	Males.	Females.	Both sexes.	Males.	Females.	Both sexes
1 to 5 days	2,610	2,084	4,694	23.08	18.43	41.51	27	23	50	.98	.83	1.81
6 to 10 days	2,154	1,836	3,990	19.05	16.24	35.29	248	156	404	8.97	5.65	14.62
11 to 15 days	695	589	1,284	6.15	5.21	11.36	394	287	681	14.26	10.39	24.65
16 to 20 days	258	220	478	2.28	1.95	4.23	333	261	594	12.05	9.45	21.50
21 to 25 days	144	155	299	1.27	1.37	2.64	226	182	408	8.18	6.58	14.76
26 to 30 days	107	77	184	.95	.68	1.63	129	103	232	4.67	3.73	8.40
31 days and over	214	165	379	1.88	1.46	3.34	216	178	394	7.82	6.44	14.26
Totals	6,182	5,126	11,308	54.66	45.34	100.00	1,573	1,100	2,763	56.93	43.07	100.00

TABLE 7.—*Predisposing influences in pneumonia, as indicated by the manner in which the disease was reported to have begun in some of the cases in the five years 1904-1908.*

Disease began as or followed.	Number of instances.	Disease began as or followed.	Number of instances.
Cold	2,904	Brain trouble	9
Influenza	830	Peritonitis	9
Bronchitis	459	Diphtheria	9
Exposure to inclement weather	368	Erysipelas	8
Heart disease	199	Miscarriage	8
Measles	196	Spinal trouble	8
Whooping-cough	168	Anemia	7
Senility	145	Sepsis	6
Kidney trouble	88	Teething	6
Pleurisy	85	Dropsy	6
Asthma	81	Neutral insufficiency	6
Bowel trouble	64	Epilepsy	6
Alcoholism	60	Appendicitis	6
General debility	59	Malarial fever	5
Confinement	50	Insanitary conditions	5
Meningitis	45	Syphilis	5
Stomach trouble	45	Non-acclimated	4
Traumatism	42	Otitis media	4
Rheumatism	39	Cancer	4
Tuberculosis	36	Eclampsia	4
Paralysis	28	Morphine habit	3
Tonsillitis	21	Mumps	3
Convulsions	21	Chicken-pox	3
Liver trouble	20	Uremia	2
Mal-nutrition	19	Dust on lungs	2
Abscess	19	Catarrhal fever	2
Lung trouble	18	Scarlet fever	2
Typhoid fever	17	Eczema	2
Croup	15	Adenoids	1
Apoplexy	15	Atmospheric conditions	1
Marasmus	14	Anesthesia	1
Throat trouble	10	Change of life	1
Diabetes	10	Strangulation of hernia	1
Cholera infantum	9	Eye trouble	1
Operation	9	Thrush	1

TABLE 8.—*Reported sources of contagium in pneumonia in Michigan, in the four years, 1904-1907.*

Sources.	Number of instances.
Traced to a former case in same jurisdiction	157
From outside jurisdictions	8
Foreign bodies in bronchial tubes	3
Handling mail	1
Not stated, or statements doubtful	14,211

TABLE 9.—*The* COMMUNICABILITY *of pneumonia as probably indicated by the number of contemporary cases in the same households; the* PERIOD OF INCUBATION *in pneumonia, as probably indicated by the time which elapsed between the occurrence of certain cases of this disease and recent previous cases in the same household; and the* SUSCEPTIBILITY *of certain persons to pneumonia, as probably indicated by the number of instances in which second, and even third, attacks occurred in the same persons, in Michigan, in the five years, 1904-1908.*

Time of occurrence of secondary cases in the same household.	Number of instances.	Time of occurrence of secondary cases in the same household.	Number of instances.
About same time	44	Twenty-four days	1
Twelve hours	1	Twenty-six days	1
One day	11	Twenty-seven days	2
Two days	16	One month	14
Three days	11	One month and 15 days	3
Four days	15	Two months	7
Five days	11	Three months	*7
Six days	10	Four months	8
Seven days	17	Five months	1
Eight days	8	Seven months	2
Nine days	4	Eight months	1
Ten days	5	Nine months	*1
Eleven days	4	Ten months	1
Twelve days	1	Eleven months	1
Thirteen days	5	One year	†29
Fourteen days	2	One year and seven months	*3
Fifteen days	2	Two years	‡13
Sixteen days	2	Three years	8
Nineteen days	2	Three years and six months	1
Twenty-one days	3	Four years	*3
Twenty-two days	1	Five years	§7
Twenty-three days	1	Time not stated	53

* In one instance a second attack in the same person.

† In four instances a second attack in the same person.

‡ In three instances a second attack in the same person.

§ In one instance, a second attack, and in another instance, a third attack, in the same person, in the five years.

INFLUENCE OF OCCUPATION.

The occupations of pneumonia patients in the five years, 1904-1908, were given in 7,746 instances, and of this number, at least 5,587 were engaged in occupations which, it is believed, exposed them, or rendered them susceptible, to this disease.

Heading the list are those engaged in housework—housewives, housekeepers and domestics—to the number of 2,847, many of whom spend a considerable portion of their time in ill-ventilated and dust-laden rooms. Dirt—often contaminated with infected sputum—carried into the home on the shoes and skirts, and disseminated throughout the rooms by air currents, or by the periodical sweeping and dusting, is generally believed to play a very important part in the spread of pneumonia, and other diseases of the respiratory organs.

Next in order are the farming class, to the number of 1,677, who, though naturally a hardy race, seem to be very susceptible to this disease.

Next in order are the laboring class, with 949 cases; and next to them the student class—principally young children of school age—with 482 cases.

In the four years, 1905-1908, there were 4,437 cases where the ages of the patients were given as under five years, therefore no occupation was given, and they were still too young to attend school, so could not be included in the student class.

A complete list of occupations of pneumonia patients, as reported in the five years, 1904-1908, may be found in Table 10.

RESTRICTIVE AND PREVENTIVE MEASURES.

By reference to Table 11, it will be seen that of the total number of cases of pneumonia in the five years, 1904-1908, but 5,068, or 29 per cent, were isolated from all persons except nurses and attending physicians; that in 6,724 instances, or 40 per cent of the whole number, the sputa was disinfected; and that in 8,869 instances, or 50 per cent of the whole number, the rooms occupied by pneumonia patients were disinfected. The enforcement of the restrictive and preventive measures for the year 1908 show a slight improvement over that of former years.

As previously stated, in a large number of instances, this Department received its first information of cases of pneumonia through the death returns, and, in many instances, the health officials had no knowledge of these cases until notified of the same by this Department, when, of course, it would be too late to carry out the restrictive and preventive measures. This fact will account, to a considerable extent, for the comparatively small number of cases in which precautions were taken.

TABLE 10.—*The influence of occupation in pneumonia, in the five years, 1904-1908.*

Occupations.	Number of instances.	Occupations.	Number of instances.	Occupations.	Number of instances.
Housewife	2,847	Tailor	14	Marine engineer	3
Farmer	1,677	Legal profession	13	Engineer and surveyor	3
Laborer	949	Machinist	12	Inspector	3
Student	482	Cigarmaker	12	Theatrical man	3
Mechanic	313	Nightwatch	11	Cattle buyer	2
Clerk (office or store)	178	Hotel keeper	11	Soldier	2
Merchant	176	Janitor	11	Surface foreman	2
Miner	129	Liveryman	11	Messenger	2
Teamster	87	Tinner	10	Laundryman	2
Railroad man	85	Printer	10	Hair dresser	2
Painter and paperhanger	55	Harnessmaker	10	Stone Cutter	2
Woodsman	48	Musician	10	Bookbinder	2
School teacher	48	Mail carrier	10	Buttermaker	1
Agent	43	Policeman	9	Beanpicker	1
Factory employe	39	Washerwoman	9	Well digger	1
Saloonman	33	Fisherman	7	Architect	1
Minister	31	Mason	6	Carpet weaver	1
Physician	27	Waiter	6	Elevator boy	1
Dressmaker and milliner	26	Real estate man	6	Plasterer	1
Sailor	25	Plumber	6	Upholsterer	1
Lumberman	23	Hotel porter	6	Trapper	1
Gardener and florist	22	Baker	6	Ice cream maker	1
Contractor	22	Lineman	6	Race horse man	1
Shoemaker	21	Dentist	4	Ice man	1
Cook	19	Nun	4	Chemist	1
Nurse	18	Attendant in prison or asylum	4	Salt packer	1
Butcher	17			Photographer	1
Miller	16	Veterinarian	4	Peddler	1
Barber	15	Street car conductor	3		

TABLE 11.—*Restrictive and preventive measures in pneumonia, in Michigan, in the five years, 1904-1908.*

Restrictive and preventive measures.	Number of instances.	Per cent.
ISOLATION:		
Enforced	5,068	29
Neglected	4,289	24
Not stated, or statements doubtful	8,200	47
DISINFECTION OF SPUTA:		
Enforced	6,724	*40
Neglected	1,762	*10
Not stated, or statements doubtful	8,564	*50
DISINFECTION OF BEDDING, CLOTHING, ETC., SOILED BY SPUTA:		
Enforced	9,176	*54
Neglected	1,798	*11
Not stated, or statements doubtful	6,076	*35
DISINFECTION OF ROOM OCCUPIED BY PATIENT:		
Enforced	8,869	50
Neglected	2,940	17
Not stated, or statements doubtful	5,748	33

* In 507 instances the reports stated that there was no sputa, therefore this number has been deducted from the total number of instances before making the per cent.

TUBERCULOSIS IN MICHIGAN IN 1908 AND PRECEDING YEARS.

GENERAL PREVALENCE.

During the year 1908, tuberculosis was reported present at 815 incorporated health jurisdictions in this State, with an aggregate of 2,705 cases, including 2,512 deaths.

The word "cases," as used in this article, includes only the cases of which this Department received the first report, during any one year, and is not intended to include the actual number of cases which began or were present in any year.

There were still sick at the close of the year approximately 200 persons, of whose sickness information had been received by this Department from time to time during the year. There were also a number of persons still sick at various times during the year, but of whom the Department received no information at the close of the year. Some of them may have recovered prior to December 31.

By reason of the fact that many cases of this disease are of long duration, and in some stages of the disease not under the care of a physician, the number of reports received by this Department are believed to be considerably less than the actual number of cases which occurred.

From many localities, only the deaths from tuberculosis are reported, therefore the apparent rates of deaths to cases are much too high.

In this article, the deaths reported to the Secretary of State are used in the several tables in conjunction with those reported to this Department.

The compilation of information relative to the prevalence of tuberculosis in Michigan was made for the first time in 1893, but from that time to 1898, when the new law for the registration of deaths took effect, the reports were much less than the actual number of cases and deaths which occurred. Hence the reason for commencing Table 12 with the year 1898.

The number of deaths from pulmonary tuberculosis per 100,000 persons living, reported to the Secretary of State during the twenty-nine years ending with 1897 (Table 13), probably quite accurately represents the annual fluctuations of, but not the total deaths from, this disease. It may be seen that, compared with any previous year, there was a remarkable and unprecedented decrease in the death rate from this disease in 1891, and the decrease occurred at a time when influenza was epidemic in the country. Statistics for the Eastern States at that time showed an increase in the death rates from tuberculosis, which increase was attributed to the influence of the epidemic influenza.

The decrease in tuberculosis in Michigan has apparently resulted from the education of the people to a knowledge that tuberculosis is a dangerous communicable disease, which may easily be restricted. It is one more forcible illustration of the fact that "Knowledge is Power." Knowledge of the modes whereby tuberculosis is usually spread, and of the ease with which its spread may be lessened, by the destruction or disinfection of all infected sputa, has apparently supplied a "power" which has caused an unprecedented reduction in the death rate from tuberculosis. The extent of the "campaign of education" which, in Michigan, began in 1880, and which took on an especially vigorous activity in 1891, can hardly be realized without a study of its history; but the apparent results of that educational movement are exceedingly plain to be seen from Table 13.

Some of the reasons for believing that the decrease in the death rate from tuberculosis has been due to the popular education in the way the disease is usually spread, and in the way to restrict the disease are: 1. The disease was under observation for many years before that knowledge became general, and (as shown by Table 13) it did not decrease; the decrease has been nearly coincident with the education, lagging behind somewhat at the outset, and gradually increasing later, as it would be expected to do if caused by the popular education. 2. Precisely similar decrease occurred in Michigan in the death rate from scarlet fever and from other diseases, coincident with systematic popular education in the ways those diseases are usually spread, and in the best measures for their restriction. 3. The decrease in the mortality from tuberculosis has, apparently been greatest in those States where systematic popular education for its restriction has been most general and active. 4. There is no other known cause capable of producing such a gradually increasing effect as is shown to have occurred.

TABLE 12.—*The prevalence of tuberculosis, in Michigan, in each of the eleven years, 1898-1908.*

Years.	Population.*	Number of cases.†	Number of deaths.	Deaths per 100,000 population.
1898	2,389,393	3,041	2,728	114.2
1899	2,426,331	2,975	2,516	103.7
1900	2,420,982	2,721	2,221	91.7
1901	2,448,241	2,915	2,344	95.7
1902	2,475,499	2,658	2,185	88.3
1903	2,502,758	2,745	2,319	92.7
1904	2,530,016	2,928	2,515	99.4
1905	2,557,275	2,590	2,464	96.4
1906	2,584,533	2,653	2,502	96.8
1907	2,611,792	2,699	2,496	95.6
1908	2,639,050	2,705	2,512	95.2
Average per year	2,507,806	2,785	2,437	97.1

* Estimated for intercensal years.

† From Detroit, and many other localities, only the fatal cases were reported, therefore the figures in this column do not represent the number of cases that actually occurred.

TABLE 13.—*The number of reported deaths from tuberculosis of the lungs per 100,000 persons living, in Michigan, in each of the twenty-nine years 1869-1897. Compiled from the Secretary of State's Vital Statistics of Michigan.*

Year.	1869.	1870.	1871.	1872.	1873.	1874.	1875.	1876.	1877.	1878.	1879.	1880.
Deaths	108.1	122.5	106.0	115.1	109.6	102.0	104.9	109.2	110.9	106.1	105.6	111.7
Year.	1881.	1882.	1883.	1884.	1885.	1886.	1887.	1888.	1889.	1890.	1891.	1892.
Deaths	116.1	104.4	112.3	120.8	105.3	107.3	108.7	121.0	104.3	105.4	96.3	95.2
Year.	1893.	1894.	1895.	1896.	1897.	Average, 1869-1897.						
Deaths	97.7	98.4	105.1	90.4	80.6	106.2						

GEOGRAPHICAL DISTRIBUTION.

By Table 14 it may be seen that, as indicated by the average death rate for the entire State, 97.1 deaths per 100,000 inhabitants, the disease was much more prevalent than the average in the counties of Mackinac, Grand Traverse and Wayne.

In a lesser degree, the disease was more prevalent than the average in the counties of Baraga, Houghton, Delta, Marquette, Luce, Leelanau, Kent and Benzie.

The disease was much less prevalent than the average for the State in the counties of Alger, Crawford, Otsego, Alpena, Ogemaw, Clare, Gladwin, Roscommon, Presque Isle, Missaukee, Arenac, and Oscoda.

TABLE 14.—*The geographical distribution of tuberculosis, in Michigan, in the eleven years, 1898-1908, as indicated by the average number of cases and deaths, and the average deaths per 100,000 persons living, in each geographical division, shown in the table.*

Geographical Divisions.	Average.			
	Population.*	Cases.†	Deaths.	Death rates.
UPPER PENINSULAR DIVISION	268,670	330	271	100.9
Alger county	6,283	4	3	47.7
Baraga county	5,190	6	6	115.6
Chippewa county	21,664	23	21	97.4
Delta county	26,425	36	30	113.5
Dickinson county	18,319	17	16	87.3
Gogebic county	16,900	15	14	82.8
Houghton county	67,613	104	78	115.4
Iron county	8,769	9	6	68.4
Keweenaw county	4,184	5	4	95.6
Luce county	3,581	5	4	111.7
Mackinac county	7,942	11	11	138.5
Marquette county	40,041	56	45	112.4
Menominee county	26,216	21	20	76.3
Ontonagon county	7,020	11	7	99.7
Schoolcraft county	8,623	7	6	69.6
NORTHWESTERN DIVISION	90,988	117	95	104.4
Benzie county	10,872	13	11	101.2
Grand Traverse county	23,019	42	31	134.7
Leelanau county	10,888	14	12	110.2
Manistee county	27,366	31	27	98.7
Wexford county	18,843	17	14	74.3
NORTHERN DIVISION	82,926	79	68	82.0
Antrim county	15,480	15	13	84.0
Charlevoix county	15,605	17	14	89.7
Cheboygan county	17,037	15	13	76,3
Crawford county	3,589	2	2	55.7
Emmet county	16,966	19	16	94,3
Kalkaska county	7,348	7	6	81.7
Otsego county	6,901	4	4	58.0
NORTHEASTERN DIVISION	59,817	46	42	70.2
Alcona county	5,637	5	5	88.7
Alpena county	19,816	15	14	70.6
Iosco county	10,278	9	8	77.8
Montmorency county	3,514	3	3	85.4
Ogemaw county	8,499	7	6	70.6
Oscoda county	1,853	2	1	54.0
Presque Isle county	10,220	5	5	48.9
WESTERN DIVISION	277,963	334	280	100.7
Kent county	137,937	188	150	108.7
Lake county	5,038	5	5	99.2
Mason county	19,809	22	19	95.9
Muskegon county	36,814	45	38	103.2
Newaygo county	18,273	14	14	76.6
Oceana county	17,698	15	15	84.8
Ottawa county	42,394	45	39	92.0
NORTHERN CENTRAL DIVISION	107,023	94	81	75.7
Clare county	9,054	7	6	66.3
Gladwin county	8,070	6	5	62.0
Isabella county	24,164	24	20	82.8
Mecosta county	20,520	20	18	87.7
Midland county	14,902	12	12	80.5
Missaukee county	10,054	6	5	49.7
Osceola county	18,618	17	14	75.2
Roscommon county	1,641	2	1	60.9

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*† These footnotes are below Table 12 on a preceding page.

TABLE 14.—CONCLUDED.

Geographical Divisions.	Average.			
	Population.*	Cases.†	Deaths.	Death rates.
BAY AND EASTERN DIVISION	347,863	314	288	82.8
Arenac county	9,853	5	5	50.7
Bay county	64,059	63	59	92.1
Huron county	35,215	30	28	79.5
Lapeer county	27,314	24	21	76.9
Saginaw county	84,889	77	72	84.8
Sanilac county	34,977	34	30	85.8
St. Clair county	55,487	48	43	77.5
Tuscola county	36,069	33	30	83.2
CENTRAL DIVISION	316,594	326	279	88.1
Barry county	22,312	21	17	76.2
Clinton county	25,349	23	20	78.9
Eaton county	31,161	35	30	96.3
Genesee county	42,583	47	39	91.6
Gratiot county	30,238	31	28	92.6
Ingham county	43,309	39	32	73.9
Ionia county	35,075	40	34	96.9
Livingston county	18,888	20	17	90.0
Montcalm county	33,735	32	29	86.0
Shiawassee county	33,944	38	33	97.2
SOUTHWESTERN DIVISION	143,280	154	132	92.1
Allegan county	39,038	41	34	87.1
Berrien county	49,597	55	49	98.8
Cass county	20,284	23	19	93.7
Van Buren county	34,361	35	30	87.3
SOUTHERN CENTRAL DIVISION	324,084	381	312	96.3
Branch county	26,243	29	24	91.5
Calhoun county	52,777	54	49	92.8
Hillsdale county	29,837	32	28	93.8
Jackson county	47,323	48	44	93.0
Kalamazoo county	48,930	81	53	108.3
Lenawee county	49,015	46	43	87.7
St. Joseph county	23,512	27	23	97.8
Washtenaw county	46.447	64	48	103.3
SOUTHEASTERN DIVISION	488,606	608	582	119.1
Macomb county	33,084	40	36	108.8
Monroe county	33,141	37	32	96.6
Oakland county	45,481	54	45	98.9
Wayne county	376,900	477	469	124.4

* † These footnotes are below Table 12 on a preceding page.

THE PREVALENCE OF TUBERCULOSIS IN URBAN AND RURAL LOCALITIES.

By reference to Table 15, it may be seen that, in 1908, as indicated by the death rates, tuberculosis was most prevalent in the large centers of population, particularly in the cities of from 10,000 to 25,000 inhabitants, and cities of 50,000 inhabitants and over. It may also be seen that the death rates were higher in all the groups of urban localities, with the exception of the group of cities and villages under 5,000 inhabitants, than the death rate for the entire State for that year.

By Table 15A, it is shown that, in 1908, the urban localities that showed much higher death rates from tuberculosis than the death rate for this disease for the entire State for that year were: Benton Harbor, Big Rapids, Calumet township, Charlotte, Escanaba, Detroit, Grand Haven, Hillsdale, Holland, Ionia, Ironwood, Ishpeming, Jackson, Laurium, Manistee, Marquette, Monroe, Muskegon, Negaunee, Petoskey, Pontiac, Traverse City, and Wyandotte.

The localities, shown in Table 15A, in which the death rates from tuberculosis were much lower in 1908 than the rate for the entire State for that year were: Albion, Cheboygan, Flint, Houghton, Ludington, Manistique, Mt. Pleasant, and Port Huron.

The localities, shown in Table 15A, which showed much higher death rates for tuberculosis in 1908 than the average for such localities in the years, 1904-1907, were: Adrian, Alpena, Benton Harbor, Charlotte, Hillsdale, Ironwood, Lansing, Laurium, Menominee, Monroe, Muskegon, Negaunee, Norway, Petoskey, Pontiac and St. Joseph.

The localities, shown in Table 15A, which showed much lower death rates from tuberculosis in 1908 than the average for such localities in the years 1904-1907, were: Albion, Cheboygan, Flint, Hancock, Houghton, Iron Mountain, Manistique, Mt. Clemens, Mt. Pleasant and Ypsilanti.

TABLE 15.—*The prevalence of tuberculosis in urban and rural localities, in Michigan, in 1908.*

Localities—grouped according to density of population.	Population.*	Health jurisdictions.			Cases.†	Deaths.	Death rates per 100,000 of the population.
		Total.	Infected.				
			Nubmer.	Per cent. of all jurisdiction.			
Cities over 50,000	512,905	3	3	100	640	583	113.7
Cities from 25,000 to 50,000	126,978	4	4	100	170	134	105.5
Cities from 10,000 to 25,000 and Calumet township (18,261)	233,222	16	16	100	337	310	132.9
Cities and villages from 5,000 to 10,000	188,759	28	28	100	213	209	110.7
Cities and villages under 5,000‡	354,646	329	178	54	351	314	98.5
Total urban	1,416,510	380	229	60	1,711	1,550	109.4
Balance of localities—principally townships§	1,222,540	1,278	586	46	994	962	78.7

* † These footnotes are below Table 12, on a preceding page.

‡ Exclusive of fifty-two cities and villages, for which the population in 1908 cannot be correctly estimated.

§ Includes the fifty-two cities and villages mentioned in the preceding paragraph, but does not include Calumet township, which, for the purpose of this study, is included in the third group of urban localities, which have corresponding populations.

TABLE 15A.—*The deaths from tuberculosis in 1908, and preceding years, in each of the principal localities included in the first four groups in Table 15.*

Localities.	1908.			Average, 1904-1907.		
	Population.*	Deaths.	Deaths per 100,000 inhabitants.	Population.*	Deaths.	Deaths per 100,000 inhabitants.
Adrian	11,706	13	111.1	11,065	6	54.2
Albion	5,367	2	37.3	5,102	4	78.4
Alpena	12,998	15	115.4	12,625	8	63.4
Ann Arbor	14,689	17	115.7	14,631	21	143.5
Battle Creek	25,863	24	92.8	23,582	28	118.7
Bay City	40,535	39	96.2	37,352	†37	99.1
Benton Harbor	6,842	13	190.0	6,755	10	148.0
Big Rapids	5,018	7	139.5	4,915	6	122.1
Cadillac	7,789	6	77.0	7,229	6	83.0
Calumet township	18,261	24	131.4	17,702	22	124.3
Charlotte	5,360	9	167.9	4,964	5	100.7
Cheboygan	6,971	4	57.4	6,821	6	88.0
Coldwater	6,234	6	96.2	6,229	5	80.3
Detroit	358,159	436	121.7	333,504	415	124.4
Escanaba	12,647	19	150.2	11,679	23	196.9
Flint	16,665	12	72.0	15,552	16	102.9
Grand Haven	5,735	7	122.1	5,425	6	110.6
Grand Rapids	103,871	96	92.4	98,776	107	108.3
Hancock	8,024	9	112.2	6,782	12	176.9
Hillsdale	5,467	8	146.3	5,056	6	118.7
Holland	10,142	13	128.2	9,407	11	116.9
Houghton	5,333	3	56.3	4,715	5	106.0
Ionia	5,235	7	133.7	5,227	7	133.9
Iron Mountain	7,928	6	75.7	8,339	10	119.9
Ironwood	10,333	16	154.8	10,137	6	59.2
Ishpeming	9,991	15	150.1	11,011	17	154.4
Jackson	25,420	32	125.9	25,345	32	126.3
Kalamazoo	35,160	39	110.9	31,799	46	144.7
Lansing	24,067	23	95.6	21,698	13	59.9
Laurium	9,664	12	124.2	8,407	7	83.3
Ludington	7,352	5	68.0	7,294	4	54.8
Manistee	11,156	19	170.3	12,126	17	140.2
Manistique	5,066	3	59.2	4,773	5	104.8
Marquette	11,272	16	141.9	10,893	16	146.9
Menominee	9,374	11	117.3	10,451	9	86.1
Monroe	7,213	10	138.6	6,535	5	76.5
Mt. Clemens	7,640	9	117.8	7,308	12	164.2
Mt. Pleasant	5,306	3	56.5	4,793	4	83.5
Muskegon	20,976	33	157.3	20,927	24	114.7
Negaunee	6,659	11	165.2	6,746	8	118.6
Norway	5,558	6	108.0	5,125	4	78.0
Owosso	9,594	9	93.8	9,314	11	118.1
Petoskey	5,087	8	157.3	5,149	6	116.5
Pontiac	11,999	29	241.7	11,302	14	123.9
Port Huron	20,898	15	71.8	20,355	13	63.9
Saginaw	50,875	51	100.2	48,210	46	95.4
St. Joseph	5,489	6	109.3	5,385	4	74.3
Sault Ste. Marie	12,346	14	113.4	11,781	15	127.3
Traverse City	13,067	32	244.9	11,924	28	234.8
Wyandotte	5,667	8	141.2	5,516	8	145.0
Ypsilanti	7,796	6	77.0	7,666	8	104.4

* Estimated for intercensal years.

† Does not include West Bay City for 1904, which was consolidated with Bay City in 1905.

THE SEASONAL PREVALENCE OF TUBERCULOSIS.

As a rule, tuberculosis, in the early stages, is not recognized, and consequently the time of its inception is not generally known or reported.

This, coupled with the fact that regular reports of the progress of many cases are lacking, renders it difficult to determine, with any degree of accuracy, the seasonal prevalence of the disease. Table 16, is, therefore, designed to take the place of a table showing the seasonal prevalence. The months of greatest fatality, named in the order of greatest number of deaths, were April, May and March; the months of least fatality being from July to September, inclusive.

TABLE 16.—*The seasonal fatality from tuberculosis, in Michigan, as shown by the average number of deaths from this disease in each month in the fifteen years, 1894-1908.*

Months	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Average number of deaths	164	167	180	186	183	154	147	146	141	158	152	166

LOCATION OF THE DISEASE IN TUBERCULOSIS.

The location of the disease in tuberculous persons for the period of fourteen years, ending in 1908, is shown in Table 17. With a view to aiding this study, the body has been divided into five divisions, as follows: Cranial cavity, spine, thoracic cavity, abdominal cavity and joints. As may be seen by the above mentioned Table, the disease was located in the thoracic cavity in nearly seven times as many instances as in all the other divisions combined, and of the organs of the thoracic cavity, the disease was located in the lungs in thirty-one times as many instances as in all the other organs of that cavity combined.

Usually the disease was located in more than one part of the body, and in many instances several different organs or parts, at the same time.

TABLE 17.—*Location of the disease in tuberculous persons, in Michigan, during the fourteen years, 1895-1908.*

Part of the body.			Number of instances.
Cranial cavity (meninges and membranes)			61
Spine (cord and membranes)			82
Thoracic cavity	Pharynx	10	20,858
	Larynx	236	
	Bronchi	112	
	Lungs	20,216	
	Pleura	23	
	Instances in which the location of the disease was not definitely specified	261	
Abdominal cavity	Stomach	210	1,957
	Liver	83	
	Kidneys	101	
	Spleen	6	
	Bladder	35	
	Intestines (large and small)	1,162	
	Peritoneum	248	
	Instances in which the location of the disease was not definitely specified	112	
Joints	Shoulder	3	122
	Elbow	2	
	Hip	79	
	Knee	27	
	Joints not specified	11	
Instances in which the disease was located in the tissues or other parts of the body but not definitely specified			842

REPORTED SOURCES OF CONTAGIUM.

The difficulty experienced in tracing cases of tuberculosis to their source is nowhere better illustrated than in the very small number of reports received at this office from year to year which throw any light upon this phase of the study of tuberculosis, and it is probable that, in many instances, where a source is reported, the information is based upon circumstantial evidence, only. From the reports of tuberculosis in 1907 and 1908, it is learned that 256 cases were traced to former cases of the disease, and that, in 714 instances, the patients had tuberculous relatives or associates.

In reply to the question, "Can you trace any other case of consumption or tuberculosis to this case?" the health officers answered "Yes" in 28 instances.

PREDISPOSING INFLUENCES AND PREMONITORY SYMPTOMS.

For the reason that very many cases of tuberculosis are not recognized or reported until the advanced stage has been reached, the information contained in past reports relative to the predisposing influences and premonitory symptoms in tuberculosis was, necessarily, very meagre and, probably, not entirely reliable. Since 1905, information along these lines was not asked for, but Table 18, which contains the information obtained during a period of nine years, is reprinted for the benefit of those who wish to make a study of the subject in connection with Table 7 in the preceding article on pneumonia. By a comparison of these tables, it may be seen that the predisposing influences are, practically, the same in tuberculosis as in pneumonia, and that both the tables emphasize the necessity for the "ounce of prevention" in the prompt and thorough treatment of a cold or cough, and in the institution of restrictive and preventive measures in cases of influenza, bronchitis, typhoid fever, measles, whooping-cough, etc.

TABLE 18.—*Predisposing influences and premonitory symptoms in* SOME OF THE CASES OF *tuberculosis in Michigan, in the nine years, 1897-1905.*

Disease began with or followed.	No. of instances.	Disease began with or followed.	No. of instances.	Disease began with or followed.	No. of instances.
Cough and cold	4,597	Fistula	5	Blood poisoning	1
Influenza	1,197	Heart trouble	5	Dropsy	1
Bronchitis	969	Scrofula	4	Ulceration of cornea	1
Pneumonia	634	Change of life	4	Aphonia	1
Hemorrhage	622	Hay fever	4	Insomia	1
General debility	305	Typhoid pneumonia	4	Womb trouble	1
Pleurisy	87	Headache	4	Over exertion	1
Typhoid fever	67	Profuse expectoration	4	Complication of diseases	1
Catarrh	67	Pain in abdomen	4	Pain in shoulder	1
Bowel, stomach and intestinal trouble	60	Dyspepsia	3	Pus-infected hand	1
		Maramus	3	Tape worm	1
Measles	53	Tubercular glands	3	Pelvic celluitis	1
Asthma	39	Swelling in neck	3	Hardening of lungs	1
Child birth	38	Swelling of limbs	3	Softening of brain	1
Fever	35	Scarlet fever	3	Appendicitis	1
Diarrhea	34	Tonsillitis	3	Cholera infantum	1
Abscess	32	Paralysis	3	Ulceration of rectum	1
Throat trouble	31	Night sweats	3	Brain fever	1
Malarial fever	29	Gangrene of lungs	2	Enlargement of spleen	1
Whooping-cough	26	Pharyngitis	2	Result of operation	1
Rheumatism	22	Lupus on face	2	Cancer	1
Glandular affection	20	Extreme nervousness	2	Pain in breast	1
Kidney and bladder trouble	13	Lumbago	2	Diphtheria	1
Pain in side	12	Curvature of spine	2	Sore mouth	1
Laryngitis	9	Tumor	2	Result of vaccination	1
After miscarriage	8	Diabetes	2	Peritonitis	1
Suppression of menses	8	Inhalation of dust	2	Pain in rectum	1
Injury	8	Pott's disease	2	Coughed up a pin which had been swallowed in childhood	1
Anemia	7	Empyema	2		
Liver trouble	6	Cigarette smoking	2	Choking and filling up	1

INFLUENCE OF AGE AND SEX IN TUBERCULOSIS.

Table 19 indicates that the greatest number of those of both sexes who died or recovered from tuberculosis were between the ages of 20 and 30 years. From infancy up to the age of 30 years there was a gradual increase, and from the ages of 30 to 80 years there was a gradual decrease in the number of those who died or recovered. Of those who died between the ages of 1 and 40 years, the greater number were females, and of those who recovered between the ages of 10 and 40 years, the greater number were also females. Of those who died between the ages 40 and 80 years, the greater number were males, which is also true of those who recovered between the ages of 40 and 70 years. At all ages, the females constituted 54 per cent of those who died.

The average age of fatal cases in the fifteen years, 1894-1908, was for males 36.5, and for females 32.8.

The average age of non-fatal cases in the fifteen years, 1894-1908, was for males 32.4, and for females 28.9 years.

TABLE 19.—*The influence of age and sex in tuberculosis, as indicated by the number of those of known ages who died or recovered from this disease, in Michigan, in the fifteen years, 1894-1908. Arranged by sex, in age periods of ten years each.*

Age periods.	Died.						Recovered.		
	Number.			Per cent.			Number.		
	Males.	Females.	Both sexes.	Males.	Females.	Both sexes.	Males.	Females.	Both sexes.
Under 10 years	471	533	1,004	1.67	1.89	3.56	4	2	6
10 to 19 years	1,120	2,247	3,367	3.97	7.97	11.94	11	16	27
20 to 29 years	3,751	5,039	8,790	13.30	17.87	31.17	15	23	38
30 to 39 years	2,664	3,223	5,887	9.45	11.43	20.88	13	24	37
40 to 49 years	1,962	1,756	3,718	6.96	6.22	13.18	11	6	17
50 to 59 years	1,442	1,076	2,518	5.11	3.82	8.93	8	2	10
60 to 69 years	985	872	1,857	3.50	3.09	6.59	3	1	4
70 to 79 years	503	412	915	1.78	1.46	3.24	....	2	2
80 years and over	65	78	143	.23	.28	.51	....	....	....
All ages	12,963	15,236	28,199	45.97	54.03	100.00	65	76	141

INFLUENCE OF COLOR IN TUBERCULOSIS.

In Table 20 it is shown that, according to the proportion of white and colored persons in the population, tuberculosis was more prevalent among the colored population.

Of the colored population the disease was most prevalent among the Indians.

TABLE 20.—*The color of* SOME OF THE *tuberculosus persons, in Michigan, reported during the fourteen years, 1895-1908.*

Color.	Number of instances in which the color was stated.	Per cent.	Approximate proportion of the total population of the State.—Expressed in per cents.
White	26,940	96.64	99.08
Black (Negro)	545	1.95	.64
Red (Indian)	389	1.37	.26
Yellow (Japanese)	2	.04	....

CIVIL CONDITION OF TUBERCULOUS PERSONS.

During the years 1895-1908, the reports of cases in which the civil condition of the patients was stated, showed that 58 per cent of the patients were or had been married, and that 42 per cent were single.

INFLUENCE OF OCCUPATION IN TUBERCULOSIS.

What has been said in the preceding article, relative to the influence of occupation in pneumonia, will apply equally to tuberculosis, as a comparison of Tables 10 and 21 will show.

During the fourteen years in which the occupation of tuberculosis persons has been studied, very many cases were reported as having no occupations, as infants, inmates of charitable, penal and reformatory institutions, etc.

To learn what occupations render persons more susceptible to tuberculosis than others, this Department has made a special study of certain occupations, showing the proportionate mortality from tuberculosis in 1908, compared with the average mortality from tuberculosis of all persons in Michigan, in the five years, 1903-1907, by age groups, as may be seen by Tables 21A, 21B, etc.

By reference to Table 21A, it is shown that the average annual per cent of deaths to tuberculosis, among all persons, in the five years, 1903-1907, is 9.4; by reference to Table 21C, it will be seen that the average annual per cent of deaths due to tuberculosis among males, for the same five year period, is 8.4; and Table 21F shows that the average annual per cent of deaths due to tuberculosis among females, for the same five year period, is 10.6.

Table 21A also shows that, in 1908, tuberculosis was responsible for 35.9 per cent of all deaths among persons following the occupation of cigarmakers, which, as compared with the average, or normal, death rate from tuberculosis among all persons (9.4), is 282 per cent higher.

Table 21B shows that, in 1908, tuberculosis was responsible for 31.2 per cent of all the deaths among school teachers, which was 232 per cent higher than the normal rate for all persons. By reference to the same Table it will be seen that, in 1908, tuberculosis was responsible for 80 per cent of the deaths among school teachers between the ages of 25 and 34, inclusive.

TABLE 21.—*Occupations of 19,642 tuberculous persons, in Michigan, in the fourteen years, 1895-1908.*

Occupations.	Number of instances.	Occupations.	Number of instances.	Occupations.	Number of instances.
Housework	8,165	Electrician	20	Silk worker	2
Farmer	2,742	Stone or marble cutter	19	Chauffeur	2
Laborer	2,358	Fireman	19	Stereotyper	2
Student	1,068	Miller	18	Chiropodist	2
Clerk (office or store)	925	Plumber	18	Diver	2
Mechanic	517	Janitor	14	Bootblack	2
Merchant	486	Metal polisher	13	Scientist	2
Dressmaker or Milliner	249	Dentist	10	Stockbuyer	2
Teacher	249	Mason	10	Broommaker	2
Machinist	204	Theatrical person	9	Chemist	2
Miner	201	Lumberman	9	Weaver	2
Factory employee	188	Civil engineer	7	Oculist	2
Painter or paperhanger	172	Undertaker	7	Billposter	2
Teamster	156	Contractor and builder	7	Trapper	2
Saloon man	144	Porter	7	Furniture packer	2
Salesman or agent	133	Patrolman	7	Millwright	1
Railroad employe	129	Tanner	6	Elevator man	1
Cigarmaker	99	Boom man	5	Steward	1
Barber	97	Butcher	5	Plasterer	1
Printer	96	Blacksmith	5	Bookbinder	1
Engineer	80	Hairdresser	4	Ballonist	1
Cook	71	Hunter	4	Attendant in asylum	1
Sailor	69	Veterinary surgeon	4	Dancing master	1
Woodsman	66	Athlete	4	Prostitute	1
Tailor	57	Peddler	4	Feather renovator	1
Artist	55	Telephone operator	4	Chimney sweep	1
Moulder	55	Jeweler	4	Papermaker	1
Shoemaker	49	Motorman	4	Milkman	1
Physician or surgeon	48	Glassworker	4	Sewer inspector	1
Musician	48	Candymaker	4	Cheesemaker	1
Nurse	45	Brassworker	3	Engraver	1
Baker	44	Carriage trimmer	3	Messemger	1
Gardner or florist	42	Liveryman	3	Iceman	1
Laundry work	36	Buttermaker	3	Saw filer	1
Waiter	36	Rag picker and sorter	3	Jockey	1
Minister	31	Watchman	3	Baseball player	1
Lawyer	27	Harness maker	3	Shears grinder	1
Soldier	26	Coremaker	3	Newsboy	1
Photographer	23	Cooper	2		
Fisherman	20	Upholsterer	2		

Table 21C indicates that, in 1908, tuberculosis was responsible for 18.8 per cent of all deaths among printers (males), which, compared with the normal death rate among males (8.4), is 124 per cent higher than the normal.

Table 21D shows that tuberculosis was responsible for 16.7 per cent of all deaths among painters (males), which, compared with the average death rate among males (8.4), is 99 per cent higher than normal.

By Table 21E it will be seen that, in 1908, tuberculosis was responsible for 15.8 per cent of all deaths among teamsters (males), which, compared with the average death rate of all males (8.4), is 88 per cent higher than normal.

Table 21F indicates that, in 1908, tuberculosis was responsible for 15.2 per cent of all deaths among dressmakers (females), which, compared with the average death rate from tuberculosis among females (10.6), is 43 per cent higher than normal. By reference to the same Table it will be seen that, in 1908, tuberculosis was responsible for 83 per cent of the deaths among dressmakers between the ages of 25 and 34, inclusive.

Table 21G indicates that, in 1908, tuberculosis was responsible for 11.8 per cent of all deaths among miners (males), which, compared with the average death rate of all males (8.4), is 40 per cent higher than normal. It is perhaps due to the fact that so many employed in this occupation met death through violence, that this rate is so low.

Table 21H shows that, in 1908, tuberculosis was responsible for 9.4 per cent of all the deaths among tailors, which, as compared with the average death rate of all persons (9.4), is exactly normal.

Table 21I shows that, in 1908, tuberculosis was responsible for only 7.5 per cent of all the deaths among carpenters (males), which, compared with the average death rate for males (8.4), is 11 per cent less than normal. This low rate is no doubt due to the fact that they are usually employed where they get an abundance of fresh air.

TABLE 21A.—*The proportionate mortality from tuberculosis among cigarmakers in 1908, compared with that of all persons in Michigan, from 1903-1907, by age groups.*

Age at death.	Deaths of cigarmakers in 1908, due to—		Per cent. of all deaths due to tuberculosis among—	
	All causes.	Tuberculosis.	Cigarmakers, 1908.	All persons in Michigan, 1903-1907.
15 to 24 years	9	6	66.6	27.1
25 to 34 years	13	7	53.8	25.8
35 to 44 years	3	1	33.3	16.6
45 to 54 years	6	....	....	9.4
55 to 64 years	4	....	....	5.1
65 years and over	4	....	....	1.5
All ages	39	14	35.9	9.4

TABLE 21B.—*The proportionate mortality from tuberculosis among school teachers in 1908, compared with that of all persons in Michigan, from 1903-1907, by age groups.*

Age at death.	Deaths of school teachers in 1908, due to—		Per cent. of all deaths due to tuberculosis among—	
	All causes.	Tuberculosis.	School teachers, 1908.	All persons in Michigan, 1903-1907.
15 to 24 years	28	10	35.7	27.1
25 to 34 years	20	16	80.0	25.8
35 to 44 years	15	5	33.3	16.6
45 to 54 years	12	1	8.3	9.4
55 to 64 years	9	1	11.1	5.1
65 years and over	25	1	4.0	1.5
All ages	109	34	31.2	9.4

TABLE 21C.—*The proportionate mortality from tuberculosis among printers in 1908, compared with that of all males in Michigan, from 1903-1907, by age groups.*

Age at death.	Deaths of printers in 1908, due to—		Per cent. of all deaths due to tuberculosis among—	
	All causes.	Tuberculosis.	Printers, 1908.	All males in Michigan, 1903-1907.
15 to 24 years	11	4	36.4	21.9
25 to 34 years	6	1	16.7	23.8
35 to 44 years	2	1	50.0	16.1
45 to 54 years	6	....	....	9.7
55 to 64 years	3	....	....	5.0
65 years and over	4	....	....	1.5
All ages	32	6	18.8	8.4

TABLE 21D.—*The proportionate mortality from tuberculosis among painters in 1908, compared with that of all males in Michigan, from 1903-1907, by age groups.*

Age at death.	Deaths of painters in 1908, due to—		Per cent. of all deaths due to tuberculosis among—	
	All causes.	Tuberculosis.	Painters. 1908.	All males in Michigan, 1903-1907.
15 to 24 years	7	2	28.6	21.9
25 to 34 years	24	9	37.5	23.8
35 to 44 years	18	4	22.2	16.1
45 to 54 years	25	2	8.0	9.7
55 to 64 years	25	3	12.0	5.0
65 years and over	39	3	7.7	1.5
All ages	138	23	16.7	8.4

TABLE 21E.—*The proportionate mortality from tuberculosis among teamsters in 1908, compared with that of all males in Michigan, from 1903-1907, by age groups.*

Age at death.	Deaths of teamsters in 1908, due to—		Per cent. of all deaths due to tuberculosis among—	
	All causes.	Tuberculosis.	Teamsters, 1908.	All males in Michigan, 1903-1907.
15 to 24 years	14	5	35.7	21.9
25 to 34 years	23	6	26.1	23.8
35 to 44 years	18	2	11.1	16.1
45 to 54 years	22	3	13.6	9.7
55 to 64 years	17	2	11.8	5.0
65 years and over	20	....	....	1.5
All ages	114	18	15.8	8.4

TABLE 21F.—*The proportionate mortality from tuberculosis among dressmakers in 1908, compared with that of all females in Michigan, from 1903-1907, by age groups.*

Age at death.	Deaths of dressmakers in 1908, due to—		Per cent. of all deaths due to tuberculosis among—	
	All causes.	Tuberculosis.	Dress-makers, 1908.	All females in Michigan, 1903-1907.
15 to 24 years	14	4	28.6	32.6
25 to 34 years	6	5	83.3	27.7
35 to 44 years	14	1	7.1	17.1
45 to 54 years	12	....	....	9.0
55 to 64 years	9	....	....	5.3
65 years and over	11	....	....	1.1
All ages	66	10	15.2	10.6

TABLE 21G.—*The proportionate mortality from tuberculosis among miners in 1908, compared with that of all males in Michigan, from 1903-1907, by age groups.*

Age at death.	Deaths of miners in 1908, due to—		Per cent. of all deaths due to tuberculosis among—	
	All causes.	Tuberculosis.	Miners, 1908.	All males in Michigan, 1903-1907.
15 to 24 years	58	3	5.2	21.9
25 to 34 years	63	8	12.7	23.8
35 to 44 years	51	7	13.7	16.1
45 to 54 years	31	4	12.9	9.7
55 to 64 years	26	3	11.5	5.0
65 years and over	16	4	25.0	1.5
All ages	245	29	11.8	8.4

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TABLE 21H.—*The proportionate mortality from tuberculosis among tailors in 1908, compared with that of all persons in Michigan, from 1903-1907, by age groups.*

Age at death.	Deaths of tailors in 1908, due to—		Per cent. of all deaths due to tuberculosis among—	
	All causes.	Tuberculosis.	Tailors, 1908.	All persons in Michigan, 1903-1907.
15 to 24 years	3	1	33.3	27.1
25 to 34 years	9	3	33.3	25.8
35 to 44 years	7	2	28.6	16.6
45 to 54 years	23	3	13.0	9.4
55 to 64 years	25	1	4.0	5.1
65 years and over	39	....	....	1.5
All ages	106	10	9.4	9.4

TABLE 21I.—*The proportionate mortality from tuberculosis among carpenters in 1908, compared with that of all males in Michigan, from 1903-1907, by age groups.*

Age at death.	Deaths of carpenters in 1908, due to—		Per cent. of all deaths due to tuberculosis among—	
	All causes.	Tuberculosis.	Carpenters, 1908.	All males in Michigan, 1903-1907.
15 to 24 years	8	4	50.0	21.9
25 to 34 years	24	5	20.8	23.8
35 to 44 years	33	8	24.2	16.1
45 to 54 years	59	9	15.3	9.7
55 to 64 years	92	4	4.3	5.0
65 years and over	240	4	1.7	1.5
All ages	456	34	7.5	8.4

DURATION OF SICKNESS IN TUBERCULOSIS.

In studying Table 22, it should be borne in mind that, in a large number of instances, the beginning of the disease was not generally known, the duration periods given usually representing the time which elapsed between the recognition of the disease and the death or recovery of the patient. This may be seen by the large number of cases of those who died or recovered at some time within one year of the reported time of commencement of sickness.

TABLE 22.—*The reported duration of sickness in 18,111 fatal and non-fatal cases of tuberculosis, in Michigan, during the fifteen years, 1894-1908.*

Duration periods.	Fatal cases.						Non-fatal cases.		
	Number.			Per cent.			Number.		
	Males.	Females.	Both sexes.	Males.	Females.	Both sexes.	Males.	Females.	Both sexes.
1 month	568	483	1,051	3.16	2.69	5.85	6	4	10
2 months	413	488	901	2.30	2.72	5.02	10	5	15
3 months	493	607	1,100	2.75	3.38	6.13	7	10	17
4 months	428	548	976	2.38	3.05	5.43	7	2	9
5 months	358	482	840	1.99	2.68	4.67	6	5	11
6 months	649	751	1,400	3.62	4.18	7.80	4	4	8
7 months	288	438	726	1.60	2.44	4.04	3	4	7
8 months	331	426	757	1.85	2.37	4.22	4	5	9
9 months	230	416	646	1.28	2.32	3.60	1	5	6
10 months	204	280	484	1.14	1.56	2.70	1	1	2
11 months	175	257	432	.97	1.43	2.40	3	1	4
Under 1 year	4,137	5,176	9,313	23.04	28.82	51.86	52	46	98
1 to 2 years	1,860	2,301	4,161	10.36	12.81	23.17	12	19	31
2 to 3 years	999	1,170	2,169	5.56	6.52	12.08	4	5	9
3 to 4 years	441	483	924	2.46	2.69	5.15	2	3	5
4 to 5 years	188	208	396	1.04	1.16	2.20	2	3	5
5 years and over	464	532	996	2.58	2.96	5.54	....	4	4
Totals	8,089	9,870	17,959	45.04	54.96	100.00	72	80	152

RESTRICTIVE AND PREVENTIVE MEASURES.

That the education of the people in matters pertaining to the restriction of tuberculosis has not produced the results which, considering the wide publicity given the subject, might have been anticipated, is indicated by Table 23. The destruction of the sputa—upon which the restriction of tuberculosis principally depends—was properly carried out in but forty-five per cent of all the cases which occurred in the years 1904-1908. It is not easy to place the blame for this condition, because it is believed that the members of the medical profession and the laity are both alive to the great importance of such restrictive measures, and well informed as to the simple methods of accomplishing the destruction of the infective material. In many cases the disease is not recognized, or the services of a physician called and restrictive measures begun until the patient is in the advanced stages of the disease.

In the pamphlet of instructions for the restriction and prevention of tuberculosis, issued by this Department, it is recommended that "All dejecta of a tuberculous person should be destroyed or disinfected; because it has been shown that the bacilli are to be found in the urine of persons having tubercular disease of the urinary organs, and in the fæces of those having tubercular disease of the bowels, and they may be in the fæces of those who swallow sputa containing the bacilli, that is, possibly, of any tuberculous person." And yet, in the years 1904-1908, in but 45 per cent of all cases reported in those years, in which the disease was located in the bowels, or bladder, were the discharges from these organs disinfected.

The disinfection of the rooms which the patient has occupied is of great importance, and is usually carried out in as many instances as other restrictive measures, but the disinfection is too often limited to the bedroom of the patient. Where a tuberculous person has had the run of the entire house,—as they usually do prior to the last stages of the sickness—the disinfection of the entire house would be a wise precaution. It is quite probable that, in nearly every case, the disinfection of the sitting room is quite as essential as the disinfection of the bedroom of the patient. The necessity for the disinfection of all the rooms occupied or frequented by tuberculous persons is emphasized by the fact that very many of the cases of tuberculosis reported to this Department are stated to be "Coughing Consumptives," many of whom do not take precautions, during a fit of coughing, to prevent droplets of sputa from being projected on to the walls and articles of furniture.

For the better restriction of tuberculosis, three lines of work, of paramount importance, and previously outlined in many publications of this Board, are here reiterated:

1. A careful study of the early symptoms of the disease, so that incipient cases may be more easily and more frequently recognized than at the present time.
2. Careful tuition of the patient in the best measures for preventing the spread of the disease to others, and for securing himself or herself against reinfection.
3. Painstaking and conscientious effort on the part of the patient to prevent himself or herself from becoming a center of infection.

The burden of this work must, of necessity, devolve upon the medical practitioners, and it is to them we must look mainly for any material reduction in the sickness and deaths from this disease.

To the patients, the duty of taking care of and destroying the sputa, the turning away of the face and covering the mouth and nostrils during a fit of coughing when in close proximity to others, the disinfection of the dejecta, and the thorough disinfection of all drinking vessels and other articles which may come in contact with the mouth, and which may be used by others as well as themselves, may seem irksome, and to some unnecessary and unimportant. Nevertheless, until this daily and hourly task shall become an integral part of every patient's daily life, we cannot hope for a successful termination of the warfare now being waged against this disease.

A person who, while suffering from tuberculosis, carelessly or willfully expectorate promiscuously and refuses to take precautionary measures, should be placed in detention until willing to comply with the simple and reasonable requirements laid down for his or her guidance.

TABLE 23.—*Restrictive and preventive measures in tuberculosis, in Michigan, in the five years, 1904-1908.*

Restrictive and preventive measures.	Number of cases.	Per cent.
DISINFECTION OF SPUTA:		
Enforced	5,880	*45
Neglected	714	*6
Not stated, or statements doubtful	6,397	*49
DISINFECTION OF SOILED BEDDING, CLOTHING, ETC.:		
Enforced	7,862	58
Neglected	632	5
Not stated, or statements doubtful	5,081	37
DISINFECTION OF DISCHARGES FROM BOWELS AND BLADDER:		
Enforced	389	†45
Neglected	262	†30
Not stated, or statements doubtful	216	†25
DISINFECTION OF ROOMS OCCUPIED BY PATIENTS:		
Enforced	7,267	54
Neglected	1,326	10
Not stated, or statements doubtful	4,982	36

* Disinfection of the sputa was not considered necessary in 584 instances, in which there was said to be no sputa, or in which the disease was said to be located only in the bowels, stomach, liver, etc., therefore this number has been deducted from the 13,575 cases, reported during the five years, before making the per cent.

† Disinfection of the bowel discharges was considered necessary in but 867 instances, i. e., where the disease was located solely, or in combination with some other organ, in the bowels, or in some other part of the body from which infection might leave the body by way of the bowels or bladder.

BACTERIOLOGICAL DIAGNOSIS IN TUBERCULOSIS.

During the fourteen years, 1895-1908, reports relative to the bacteriological examination of 3,212 samples of sputa of suspected cases of tuberculosis indicate that 94 per cent gave positive and 6 per cent negative results.

MENINGITIS IN MICHIGAN IN 1908 AND PRECEDING YEARS.

GENERAL PREVALENCE.

During the year 1908, meningitis was reported to the Secretary of the State Board of Health from 267 localities, in which there were reported to have occurred 622 cases, including 612 deaths from this disease.

From the number of cases and deaths, shown in Table 24, it will be seen that, as a rule, only the fatal cases were reported.

Prior to 1904, the disease was considered under the various names reported, viz.: Cerebro-spinal meningitis, cerebral meningitis, meningitis, spinal meningitis, tubercular meningitis and traumatic meningitis. In the articles subsequent to 1903, all the various forms of the disease have been considered under the general title of meningitis.

For the purpose of learning what relation the number of cases and deaths from tubercular and traumatic meningitis bear to the total meningitis, these two forms of the disease have been considered separately in Table 26.

In the tables, wherever possible, totals, averages and per cents for a series of years, rather than for the single year 1908, have been shown.

By Table 24, it will be seen that, in 1899, when the statistical study of meningitis was first commenced by this Department, the disease was unusually prevalent, therefore the average of series of years beginning with 1899 is higher than it would be for similar periods under normal conditions.

Table 24 shows a much greater average death rate from meningitis in the years in which efforts have been made for its restriction and prevention than the average death rate for a long series of years prior to that time, shown in Table 25. This is probably due to the fact that, prior to 1898, under the old law for the registration of deaths, not all deaths were reported, and to the fact that the rates in Table 25 do not include tubercular meningitis, which, in recent years, has caused about 16 per cent of all the deaths from meningitis.

TABLE 24.—*The prevalence of meningitis, in Michigan, in each of the ten years, 1899-1908.*

Years.	Population.*	Number of cases.†	Number of deaths.	Deaths per 100,000 population.
1899	2,426,331	1,306	1,079	44.5
1900	2,420,982	747	688	28.4
1901	2,448,241	614	594	24.3
1902	2,475,499	632	598	24.2
1903	2,502,758	645	630	25.2
1904	2,530,016	598	586	23.2
1905	2,557,275	675	646	25.3
1906	2,584,533	650	627	24.3
1907	2,611,792	680	670	25.7
1908	2,639,050	622	612	23.2
Annual averages	2,519,647	717	673	26.7

* Estimated for intercensal years.

† From many localities only the fatal cases were reported, so that the figures in this column do not accurately represent the number of cases which occurred.

TABLE 25.—*The number of reported deaths from meningitis,* in Michigan, per 100,000 persons living, in each of the thirty years, 1869-1898. Compiled from the Secretary of State's Vital Statistics of Michigan.*

Years	1869.	1870.	1871.	1872.	1873.	1874.	1875.	1876.	1877.	1878.	1879.	1880.
Deaths	1.2	.9	2.0	28.6	62.6	13.9	12.0	8.6	9.3	7.2	6.6	9.7
Years	1881.	1882.	1883.	1884.	1885.	1886.	1887.	1888.	1889.	1890.	1891.	1892.
Deaths	19.6	13.0	12.7	12.8	9.2	9.4	9.3	9.6	8.0	8.6	9.6	6.8
Years	1893.	1894.	1895.	1896.	1897.	1898.†	Average, 1869-1898.					
Deaths	7.8	8.1	7.8	8.3	9.7	28.4	12.0					

* Does not include tubercular meningitis.

† Not all the deaths were reported under the old law, therefore a comparison of death rates for any year subsequent to 1897 with the death rates for any period prior to 1898 would not be reliable. The rates for the twenty-nine years, ending with 1897, probably quite accurately represent the annual fluctuations of the disease.

TABLE 26.—*The reported number of cases and deaths from tubercular and traumatic meningitis, in Michigan, in the ten years, 1899-1908.*

Years.	Tubercular.				Traumatic.			
	Number of cases.	Number of deaths.	Per cent of all forms of meningitis.		Number of cases.	Number of deaths.	Per cent of all forms of meningitis.	
			Cases.	Deaths.			Cases.	Deaths.
1899	42	41	3	4	22	22	2	2
1900	93	83	12	12	17	17	2	2
1901	86	86	14	14	22	22	4	4
1902	96	94	15	16	8	8	1	1
1903	106	106	16	17	14	14	2	2
1904	126	133	21	23	24	24	4	4
1905	95	107	14	16	3	4	4	6
1906	108	106	17	17	9	8	1	1
1907	88	86	13	13	17	17	3	3
1908	128	124	21	20	7	7	1	1

GEOGRAPHICAL DISTRIBUTION OF MENINGITIS.

By Table 27 it may be seen that, during the ten years ending with 1908, as indicated by the average death rate for the entire State (shown in Table 24), meningitis was much more prevalent than the average in the Upper Peninsula and Southeastern Divisions. By the same standard, the disease was much more prevalent than the average in the counties of Houghton, Antrim, Marquette, Wexford, Wayne, Baraga, Cheboygan, Mecosta, Menominee, Schoolcraft, and Kent.

TABLE 27.—*The geographical distribution of meningitis, in Michigan, in the ten years, 1899-1908, as indicated by the average number of cases and deaths, and the average deaths per 100,000 persons living, in each geographical division shown in the table.*

Geographical divisions.	Average.			
	Population.*	Cases.†	Deaths.	Death rates.
Upper Peninsular Division.	272,085	117.9	106.9	39.3
Alger county	6,421	2	2	31.1
Baraga county	5,166	2	2	38.7
Chippewa county	21,858	5	5	22.9
Delta county	26,748	8	8	29.9
Dickinson county	18,606	6	5	26.9
Gogebic county	17,090	5	5	29.3
Houghton county	69,079	51	45	65.1
Iron county	8,870	1	1	11.3
Keweenaw county	4,344	2	1	23.0
Luce county	3,715	.9	.9	24.2
Mackinac county	8,072	2	2	24.8
Marquette county	40,051	18	17	42.4
Menominee county	26,343	9	9	34.2
Ontonagon county	7,080	3	1	14.1
Schoolcraft county	8,642	3	3	34.7
Northwestern Division.	91,251	34	26	28.5
Benzie county	10,871	5	3	27.6
Grand Traverse county	23,153	6	5	21.6
Leelanau county	10,878	2	2	18.4
Manistee county	27,303	11	8	29.3
Wexford county	19,046	10	8	42.0
Northern Division.	84,305	28.3	25.2	29.9
Antrim county	15,584	8	7	44.9
Charlevoix county	15,924	3	3	18.8
Cheboygan county	17,160	7	6	35.0
Crawford county	3,702	.3	.2	5.4
Emmet county	17,404	6	5	28.7
Kalkaska county	7,471	2	2	26.8
Otsego county	7,060	2	2	28.3
Northeastern Division.	60,533	9.4	9.3	15.4
Alcona county	5,658	.6	.6	10.6
Alpena county	19,812	4	4	20.2
Iosco county	10,360	2	2	19.3
Montmorency county	3,526	.9	.9	25.5
Ogemaw county	8,780	.8	.7	8.0
Oscoda county	1,868	.1	.1	5.4
Presque Isle county	10,529	1	1	9.5
Western Division.	278,518	80.9	74.8	26.9
Kent county	138,335	51	46	33.3
Lake county	5,013	.9	.8	16.0
Mason county	19,744	4	4	20.3
Muskegon county	37,032	9	9	24.3
Newaygo county	18,323	3	3	16.4
Oceana county	17,718	3	3	16.9
Ottawa county	42,353	10	9	21.2
Northern Central Division.	107,319	29.4	26.1	24.3
Clare county	9,120	2	2	21.9
Gladwin county	8,318	1	.9	10.8
Isabella county	24,171	7	6	24.8
Mecosta county	20,396	8	7	34.3
Midland county	14,815	4	4	27.0
Missaukee county	10,174	2	2	19.7
Osceola county	18,648	5	4	21.5
Roscommon county	1,677	.4	.2	11.9

* † These footnotes are below Table 24, on a preceding page.

TABLE 27.—CONCLUDED.

Geographical divisions.	Average.			
	Population.*	Cases.†	Deaths.	Death rates.
BAY AND EASTERN DIVISION.	347,800	76	74	21.3
Arenac county	10,018	1	1	10.0
Bay county	63,845	16	16	25.1
Huron county	35,140	7	7	19.9
Lapeer county	27,191	4	3	11.0
Saginaw county	85,236	19	19	22.3
Sanilac county	34,944	7	6	17.2
St. Clair county	55,382	13	13	23.5
Tuscola county	36,044	9	9	25.0
CENTRAL DIVISION.	316,021	70	65	20.6
Barry county	22,182	6	5	22.5
Clinton county	25,283	5	4	15.8
Eaton county	30,963	6	6	19.4
Genesee county	42,674	9	9	21.1
Gratiot county	30,374	9	9	29.6
Ingham county	43,468	9	8	18.4
Ionia county	34,899	9	7	20.1
Livingston county	18,775	3	3	16.0
Montcalm county	33,540	8	8	23.9
Shiawassee county	33,863	6	6	17.7
SOUTHWESTERN DIVISION.	143,371	27	24	16.8
Allegan county	39,001	10	9	23.1
Berrien county	49,558	8	7	14.1
Cass county	20,173	3	3	14.9
Van Buren county	34,639	6	5	14.4
SOUTHERN CENTRAL DIVISION.	324,682	70	67	20.6
Branch county	26,305	5	5	19.0
Calhoun county	52,910	10	10	18.9
Hillsdale county	29,832	5	5	16.8
Jackson county	47,251	11	11	23.3
Kalamazoo county	49,339	12	12	24.3
Lenawee county	49,053	9	8	16.3
St. Joseph county	23,381	7	6	25.7
Washtenaw county	46,611	11	10	21.5
SOUTHEASTERN DIVISION.	493,576	177	178	36.1
Macomb county	33,096	8	8	24.2
Monroe county	33,053	8	9	27.2
Oakland county	45,618	7	7	15.3
Wayne county	381,809	154	154	40.3

* † These footnotes are below Table 24, on a preceding page.

THE PREVALENCE OF MENINGITIS IN URBAN AND RURAL LOCALITIES.

Table 28 shows meningitis to have been present, in 1908, in 28 per cent of the incorporated cities and villages, whose populations could be estimated for that year. There were 52 cities and villages whose populations could not be estimated for the year 1908, therefore these localities have been included with the rural localities, shown in the last line of Table 28.

As in the case of pneumonia and tuberculosis, previously considered, meningitis was most prevalent in the large centers of population.

By Table 28A, it may be seen that, in 1908, the urban localities which showed much higher death rates from meningitis than the death rate for this disease for the entire State (23.2), for that year, were: Albion, Bay City, Calumet township, Charlotte, Coldwater, Detroit, Escanaba, Flint, Grand Rapids, Hancock, Ionia, Iron Mountain, Ironwood, Ishpeming, Ludington, Manistee, Menominee, Muskegon, Negaunee, Petoskey, Saginaw, Sault Ste. Marie and Wyandotte.

The localities, shown in Table 28A, in which the death rates were much lower in 1908 than the rate for the entire State for that year were: Alpena, Kalamazoo, Lansing, Laurium, Mt. Clemens and Port Huron.

The localities, shown in Table 28A, which showed much higher death rates from meningitis in 1908 than the average for such localities in the years, 1904-1907, were: Battle Creek, Bay City, Hancock, Ionia, Iron Mountain, Ironwood, Ludington, Manistee, Marquette, Menominee, Muskegon, Negaunee, Saginaw, Wyandotte and Ypsilanti.

The localities, shown in Table 28A, which showed much lower death rates from meningitis in 1908 than the average for such localities in the years, 1904-1907, were: Albion, Alpena, Big Rapids, Calumet township, Charlotte, Cheboygan, Kalamazoo, Lansing, Laurium, Manistique, Mt. Pleasant, Port Huron and Traverse City.

TABLE 28.—*The prevalence of meningitis in urban and rural localities, in Michigan, in 1908.*

Localities—grouped according to density of population.	Population.*	Health jurisdictions.			Cases.†	Deaths.	Death rates per 100,000 of the population.
		Total.	Infected.				
			Number.	Per cent of all jurisdictions.			
Cities over 50,000	512,905	3	3	100	189	191	37.2
Cities from 25,000 to 50,000	126,978	4	4	100	32	30	23.6
Cities from 10,000 to 25,000 and Calumet township (18,261)	233,222	16	15	94	65	65	27.9
Cities and villages from 5,000 to 10,000	188,759	28	24	86	75	74	39.2
Cities and vilages under 5,000‡	354,646	329	59	18	74	71	20.0
Total urban	1,416,510	380	105	28	435	431	30.4
Balance of localities—principally townships§	1,222,540	1,278	162	13	187	181	14.8

* † These footnotes are below Table 24, on a preceding page.

‡ Exclusive of fifty-two cities and villages, for which the population in 1908 cannot be correctly estimated.

§ Includes the fifty-two cities and villages mentioned in the preceding paragraph, but does not include Calumet township, which, for the purpose of this study, is included in the third group of urban localities, which have corresponding populations.

TABLE 28A.—*The deaths from meningitis in 1908, and preceding years, in each of the principal localities included in the first four groups in Table 28.*

Localities.	1908.			Average, 1904-1907.		
	Population.*	Deaths.	Deaths per 100,000 inhabitants.	Population.*	Deaths.	Deaths per 100,000 inhabitants.
Adrian	11,706	3	25.6	11,065	3	27.1
Albion	5,367	2	37.3	5,102	3	58.8
Alpena	12,998	2	15.4	12,625	3	23.8
Ann Arbor	14,689	4	27.2	14,631	4	27.3
Battle Creek	25,863	6	23.2	23,582	4	17.0
Bay City	40,535	12	29.6	37,352	† 7	18.7
Benton Harbor	6,842	0	....	6,755	1	14.8
Big Rapids	5,013	1	19.9	4,915	2	40.7
Cadillac	7,789	2	25.7	7,229	2	27.7
Calumet township	18,261	10	54.8	17,702	13	73.4
Charlotte	5,360	2	37.3	4,964	3	60.4
Cheboygan	6,971	2	28.7	6,821	4	58.6
Coldwater	6,234	2	32.1	6,229	2	32.1
Detroit	358,159	137	38.3	333,504	167	50.1
Escanaba	12,647	5	39.5	11,679	5	42.8
Flint	16,665	5	30.0	15,552	4	25.7
Grand Haven	5,735	0	....	5,425	.8	14.7
Grand Rapids	103,871	32	30.8	98,776	29	29.4
Hancock	8,024	6	74.8	6,782	4	59.0
Hillsdale	5,467	0	....	5,056	.3	5.9
Holland	10,142	2	19.7	9,407	2	21.3
Houghton	5,333	1	18.8	4,715	.8	17.0
Ionia	5,235	3	57.3	5,227	.8	15.3
Iron Mountain	7,928	5	63.1	8,339	3	36.0
Ironwood	10,333	5	48.4	10,137	3	29.6
Ishpeming	9,991	9	90.0	11,011	8	72.7
Jackson	25,420	6	23.6	25,345	7	27.6
Kalamazoo	35,160	6	17.1	31,799	10	31.4
Lansing	24,067	1	4.2	21,698	3	13.8
Laurium	9,664	1	10.3	8,407	2	23.8
Ludington	7,352	4	54.4	7,294	1	13.7
Manistee	11,156	5	44.8	12,126	2	16.5
Manistique	5,066	1	19.7	4,773	2	41.9
Marquette	11,272	3	26.6	10,893	1	9.2
Menominee	9,374	7	74.7	10,451	5	47.8
Monroe	7,213	2	27.7	6,535	2	30.6
Mt. Clemens	7,640	1	13.1	7,308	1	13.7
Mt. Pleasant	5,306	1	18.8	4,793	2	41.7
Muskegon	20,976	10	47.7	20,927	5	23.9
Negaunee	6,659	7	105.1	6,746	4	59.3
Norway	5,558	0	....	5,125	.5	9.8
Owosso	9,594	2	20.8	9,314	2	21.5
Petoskey	5,087	2	39.3	5,149	2	38.8
Pontiac	11,999	0	....	11,302	2	17.7
Port Huron	20,898	3	14.4	20,355	4	19.7
Saginaw	50,875	22	43.2	48,210	10	20.7
St. Joseph	5,489	1	18.2	5,385	1	18.6
Sault Ste. Marie	12,346	4	32.4	11,781	4	34.0
Traverse City	13,067	3	23.0	11,924	4	33.5
Wyandotte	5,667	8	141.2	5,516	2	36.3
Ypsilanti	7,796	2	25.7	7,666	.8	10.4

* Estimated for intercensal years.

† Does not include West Bay City for 1904, which was consolidated with Bay City in 1905.

THE SEASONAL PREVALENCE OF MENINGITIS.

Table 29 is compiled from two different sources, and shows that meningitis is most prevalent in the months of March, April and May, and least prevalent in the months of October, November and December. This coincides with the results of observations made in epidemics of meningitis in this and other countries, the outbreak in New York in 1892 and 1893, which was most violent in May; the epidemic in Cologne in 1895, which reached its maximum in April; and the epidemic in Strasburg in 1841, in which the greatest number of cases occurred in March.

TABLE 29.—*The seasonal prevalence of meningitis, in Michigan, in so far as indicated by the average number of persons taken sick and who died from this disease in each month of the ten years, 1899-1908.*

Months.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Average number of those taken sick.	41	44	69	63	54	39	40	40	40	34	29	30
Average number of deaths.........	43	50	66	68	61	47	47	45	43	39	33	33

REPORTED SOURCES OF CONTAGIUM AND PREDISPOSING INFLUENCES IN MENINGITIS.

For the reason that the number of instances in which the sources of contagium and predisposing influences in meningitis reported were very small, as compared with the total number of cases of meningitis, since 1906, health officers were only requested to supply information relative to those cases which were traced to former cases of the disease, or which followed the four diseases, shown in Table 30 of this article, which are intimately associated with meningitis.

Table 30 may well be studied in connection with Table 31, and when continued for a number of years, Table 31 will probably be of much value in determining the connection of outbreaks of meningitis and the other diseases named in the Table.

TABLE 30.—*The reported source of contagium and predisposing influences in meningitis, in Michigan, in the ten years, 1899-1908.*

Source and predisposing influence.	Number of instances.
Traced to a former case of meningitis in another person........................	83
Following an attack, in the same person, of:	
Influenza..	124
Pneumonia..	87
Tuberculosis..	65
Bronchitis..	28

TABLE 31.—*Meningitis, in Michigan, in the five years, 1904-1908, and previous and contemporaneous cases of meningitis, tuberculosis, influenza and pneumonia, which occurred in the same families in which the meningitis patients resided.*

Disease.	The time which lapsed between cases of meningitis in 1904-1908 and previous and contemporaneous cases of the diseases named below, with the number of instances in each period of time.																
	On or about same time.	1 day.	3 days.	4 days.	9 days.	10 days.	14 days.	18 days.	1 month.	2 months.	3 months.	4 months.	5 months.	6 months.	8 months.	1 year and over.	No time stated.
Meningitis	18	2	1	......	......	2	2	......	......	1	......	1	......	1	......	1	6
Tuberculosis	27	......	......	1	1	......	2	1	2	3	3	1	......	2	1	8	23
Influenza	4	......	1	1	......	......	......	......	1	......	......	......	......	......	......	....	5
Pneumonia	2	......	......	......	......	......	1	......	......	1	......	......	1	1	......	....	4

THE INFLUENCE OF AGE AND SEX IN MENINGITIS.

Table 32 confirms what has been stated in preceding reports relative to meningitis, that it is essentially a disease of childhood, nearly 57 per cent of all the fatal cases, in which the age was stated, during the ten years ending in 1908, having occurred in children under five years of age. There was a gradual decrease in the number of deaths corresponding with each increase in the age.

With but two exceptions (ages 5 to 9 and 10 to 14 years), meningitis was most fatal among the male population at all ages shown in the table.

TABLE 32.—*The influence of age and sex in meningitis, in Michigan, as indicated by the number of those, of* KNOWN AGES, *who died from this disease in the ten years, 1899-1908. Arranged, by sex, in age periods of five years each.*

Age periods.	Number of deaths.			Per cent.			Average deaths per year.		
	Males.	Females.	Both sexes.	Males.	Females.	Both sexes.	Males.	Females.	Both sexes.
Under 5 years	2,116	1,658	3,774	31.72	24.85	56.57	212	166	378
5 to 9 years	361	366	727	5.41	5.49	10.90	36	37	73
10 to 14 years	203	222	425	3.04	3.33	6.37	20	22	42
15 to 19 years	223	182	405	3.34	2.73	6.07	22	18	40
20 to 24 years	141	118	259	2.11	1.77	3.88	14	12	26
25 to 29 years	100	92	192	1.50	1.38	2.88	10	9	19
30 to 34 years	84	72	156	1.26	1.08	2.34	8	7	15
35 to 39 years	87	62	149	1.30	.93	2.23	9	6	15
40 to 44 years	75	55	130	1.12	.83	1.95	8	6	14
45 to 49 years	65	46	111	.97	.70	1.67	7	5	12
50 years and over	212	131	343	3.18	1.96	5.14	21	13	34
All ages	3,667	3,004	6,671	54.95	45.05	100.00	367	300	667

THE DURATION OF SICKNESS IN MENINGITIS.

Table 33 shows that of 3,723 fatal cases of meningitis in the eight years, 1901-1908, nearly 38 per cent of the deaths occurred between the first and fifth days; nearly 63 per cent between the first and tenth days, and nearly 78 per cent between the first and fifteenth days.

TABLE 33.—*The duration of sickness in fatal cases of meningitis, of known duration, in Michigan, in the eight years, 1901-1908. Arranged by sex in five day periods.*

Duration periods.	Number of deaths.			Per cent.			Average deaths per year.		
	Males.	Females.	Both sexes.	Males.	Females.	Both sexes.	Males.	Females.	Both sexes.
1 to 5 days	809	598	1,407	21.73	16.06	37.79	101	75	176
6 to 10 days	477	451	928	12.81	12.12	24.93	60	56	116
11 to 15 days	289	270	559	7.76	7.25	15.01	36	34	70
16 to 20 days	119	130	249	3.20	3.49	6.69	15	16	31
21 to 25 days	101	95	196	2.71	2.55	5.26	13	12	25
26 to 30 days	48	48	96	1.29	1.29	2.58	6	6	12
31 to 35 days	26	24	50	.70	.64	1.34	3	3	6
36 to 40 days	16	17	33	.43	.46	.89	2	2	4
41 to 45 days	19	13	32	.51	.35	.86	2	2	4
46 to 50 days	9	12	21	.24	.33	.57	1	2	3
51 days and over	80	72	152	2.15	1.93	4.08	10	9	19
Totals and averages	1,993	1,730	3,723	53.53	46.47	100.00	249	216	465

RESTRICTIVE AND PREVENTIVE MEASURES IN MENINGITIS.

As may be seen by reference to Table 34, information relative to the restrictive and preventive measures in meningitis has been very meagre. As indicated by those reports in which a *definite* statement was made relative to the restrictive and preventive measures in meningitis in the five years, 1904-8, but a small proportion of the patients were isolated from all persons, excepting the nurses and attending physicians. A somewhat better showing is made in regard to the disinfection of the sputa, articles liable to be soiled by sputa and the rooms occupied by the sick persons.

TABLE 34.—*Restrictive and preventive measures in meningitis, in Michigan, in the five years, 1904-1908.*

Restrictive and preventive measures.	Number of cases.	Per cent.
ISOLATION:		
Enforced	737	23
Neglected	758	24
Not stated, or statements doubtful	1,730	53
DISINFECTION OF SPUTA:		
Enforced	800	*26
Neglected	424	*14
Not stated, or statements doubtful	1,828	*60
DISINFECTION OF BEDDING, CLOTHING, ETC., SOILED BY SPUTA:		
Enforced	1,321	*43
Neglected	361	*12
Not stated or statements doubtful	1,370	*45
DISINFECTION OF ROOM OCCUPIED BY PATIENT:		
Enforced	1,722	53
Neglected	471	15
Not stated, or statements doubtful	1,032	32

* One hundred and seventy-three cases, in which there was said to be no sputa, excluded in making this per cent.

H

TYPOID FEVER IN MICHIGAN IN 1908 AND PRECEDING YEARS.

GENERAL PREVALENCE.

By Table 35, it may be seen, that, in 1908, typhoid fever was more prevalent than in 1907, and considerably more prevalent than in the average year.

A comparison of Table 35 with Table 36 will show that the average death rate from typhoid fever in the years since 1884—when active measures for its restriction were instituted by this Department is considerably lower than in the fifteen years preceding 1884. It will also be seen that, in the years 1884-1897, inclusive, as a rule, the annual death rates were much lower than the rates in subsequent years. The higher death rates in the years 1898-1908 may be accounted for partly by the fact that, prior to 1898, under the old law for the registration of deaths, not all deaths were reported. It will be seen, however, that, in the eleven years ending with 1908, the death rates from typhoid fever have not decreased, as would be expected from the efforts put forth by this Department for the restriction of the disease. This is believed to be due to the fact that, in many localities which have public water supplies, there has been little, if any, provision made for the removal of sewage, necessitating a gradually increasing number of cesspools and resulting in a gradually increasing contamination of the underground bodies of water from which many persons in those localities derive their water supplies.

It is safe to say that no substantial decrease in the sickness and mortality from typhoid fever may be expected until every cesspool and shallow well shall have been abolished, and every public water supply permanently protected against contamination.

TABLE 35.—*The prevalence of typhoid fever, in Michigan, in each of the twenty-five years, 1884-1908.*

Years.	Population.*	Reported cases.†	Reported deaths.	Deaths per 100 cases.	Deaths per 100,000 population.
1884	1,853,658	969	290	27	15.6
1885	1,893,697	715	194	23	10.2
1886	1,933,735	1,194	282	18	14.6
1887	1,973,774	3,424	411	17	20.8
1888	2,013,812	1,511	310	21	15.4
1889	2,053,851	2,530	681	27	33.2
1890	2,093,889	1,924	304	16	14.5
1891	2,130,827	4,670	697	15	32.7
1892	2,167,765	2,591	538	21	24.8
1893	2,204,703	3,512	594	17	26.9
1894	2,241,641	2,805	506	18	22.6
1895	2,271,531	3,751	621	17	27.3
1896	2,301,421	2,506	409	16	17.8
1897	2,331,311	1,900	352	19	15.1
1898	2,361,201	2,874	634	24	26.9
1899	2,391,091	3,194	638	20	26.7
1900	2,420,982	5,122	920	18	38.0
1901	2,450,872	3,002	665	22	27.1
1902	2,475,499	2,456	596	24	24.1
1903	2,502,758	2,840	640	23	28.9
1904	2,530,016	3,028	731	24	29.7
1905	2,557,275	2,774	661	24	25.8
1906	2,584,533	3,163	785	25	30.4
1907	2,611,792	1,953	645	33	24.7
1908	2,639,050	2,656	729	27	27.6
Averages per year	2,279,627	2,683	553	21	24.3

* Estimated for intercensal years.

† Many health officers reported only the fatal cases, so that the total number of cases for each year was much in excess of those given in this column.

TABLE 36.—*The number of deaths from typhoid fever,* in Michigan, per 100,000 persons living, in each of the fifteen years, 1869-1883. Compiled from reports to the Secretary of State.*

Years	1869.	1870.	1871.	1872.	1873.	1874.	1875.	1876.	1877.	1878.	1879.	1880.	1881.	1882.	1883.	Average. 1869–1883.
Deaths	39.0	48.5	29.2	49.4	52.8	45.8	31.3	30.1	30.3	22.6	25.5	31.9	55.2	28.4	25.0	36.3

* Includes typho-malarial fever but not typhoid pneumonia.

GEOGRAPHICAL DISTRIBUTION.

Table 37 indicates that, in the eighteen years, 1891-1908, the death rate from typhoid fever in the Upper Peninsula Division was considerably higher that the average for the entire State for the same period (26.3 deaths per 100,000 inhabitants), and that this high death rate was due to unusual death rates in the counties of Baraga, Chippewa, Delta, Gogebic, Iron, Marquette and Menominee. The unusual death rates in each of these counties were due to high death rates, in certain years, in the following localities:

BARAGA COUNTY—Baraga township, 1891, 1899; Baraga village, 1891, 1899.

CHIPPEWA COUNTY—Superior township, 1899; Sault Ste. Marie city, 1893-4, 1900-6, 1908.

DELTA COUNTY—Escanaba city, 1892-3, 1897-1908; Gladstone city, 1898-1899, 1901-6.

GOGEBIC COUNTY—Bessemer City, 1893-4, 1896, 1900-1; Ironwood city, 1891, 1893, 1900, 1904-8.

IRON COUNTY—Hematite township, 1892; Iron River village, 1891, 1907-8; Crystal Falls city, 1891-2, 1906, 1908.

MARQUETTE COUNTY—Michigamme township, 1891, 1893; Republic township, 1891, 1893; Wells township, 1904; Ishpeming city, 1891-2, 1894, 1897-8, 1900, 1903, 1907; Marquette city, 1892, 1895, 1899-1900, 1902, 1904-8; Negaunee city, 1891-4, 1896, 1898, 1902, 1904-8.

MENOMINEE COUNTY—Spaulding township, 1891; Menominee city, 1891-6, 1899-1901, 1903-8.

In addition to the foregoing, in the counties of Emmet, Ingham, Kent, Midland, Missaukee, Otsego and Wexford, the death rate from typhoid fever in the eighteen years, 1891-1908, was much higher than the average for the State as a whole, but, by reason of the low death rates in the other counties in the same geographical divisions, the death rates of the geographical division in which these counties are located do not differ greatly from the average for the entire State. The high death rates in the six counties under consideration were due to high death rates, in certain years, in the following localities:

EMMET COUNTY—Little Traverse township, 1891; Springvale township, 1905; Harbor Springs village, 1891, 1893, 1895, 1897, 1903-6; Petoskey city, 1897-1902, 1906, 1908.

INGHAM COUNTY—Alaiedon township, 1899-1900; Aurelius township, 1896; Delhi township, 1891, 1894-5, 1898-9; Ingham township, 1898-9; Lansing township, 1901, 1903-4; Le Roy township, 1898; Leslie township, 1894; Locke township, 1903; Meridian township, 1899, 1900, 1903; Stockbridge township, 1891-2; Vevay township, 1902; White Oak township, 1900; Williamston township, 1891-2, 1898; Stockbridge village, 1900; Lansing city, 1891, 1893-8, 1900-6, 1908.

KENT COUNTY—Ada township, 1900; Byron township, 1899; Grand Rapids township, 1903; Lowell township, 1891; Paris township, 1900; Plainfield township, 1891, 1908; Sparta township, 1895, 1900; Walker township, 1894, 1899, 1903; Wyoming township, 1895, 1904-1907; Lisbon village, 1900; Sparta village, 1906, 1908; Grand Rapids city, 1891-1908.

MIDLAND COUNTY—Ingersoll township, 1898, 1908; Larkin township, 1900; Warren township, 1898, 1901, 1907; Coleman village, 1894; Midland City, 1895, 1899, 1901-2, 1904, 1907.

MISSAUKEE COUNTY—Norwich township, 1899, 1900; Reeder township, 1891, 1894-5, 1908; Richland township, 1893, 1900; Riverside township, 1891; Lake City village, 1893; McBain city, 1894, 1898.

OTSEGO COUNTY—Corwith township, 1891, 1899; Hayes township, 1900; Gaylord village, 1891, 1898, 1900, 1902-4.

WEXFORD COUNTY—Boon township, 1892; Greenwood township, 1900, 1903; Slagle township, 1898; South Branch township, 1891; Springville township, 1894, 1898, 1900, 1908; Harrietta village, 1892; Cadillac city, 1893, 1900-1901, 1903, 1905-6, 1908.

TABLE 37.—*The geographical distribution of typhoid fever, in Michigan, in the eighteen years, 1891-1908, as indicated by the average number of cases and deaths, and the average death per 100,000 persons living, in each geographical division shown in the table.*

Geographical divisions.	Average.			
	Population.*	Cases.†	Deaths.	Death rates.
Upper Peninsular Division.	245,472	552	86.9	35.4
Alger county	4,888	3	.6	12.3
Baraga county	4,788	23	2	41.8
Chippewa county	19,112	52	8	41.9
Delta county	23,618	43	13	55.0
Dickinson county	17,167	32	4	23.3
Gogebic county	16,042	78	7	43.6
Houghton county	58,346	79	14	24.0
Iron county	7,530	11	3	39.8
Keweenaw county	3,619	5	.7	19.3
Luce county	3,147	5	1	31.8
Mackinac county	7,775	4	.6	7.7
Marquette county	39,637	129	17	42.9
Menominee county	25,178	55	13	51.6
Ontonagon county	6,556	14	1	15.3
Schoolcraft county	8,069	19	2	24.8
Northwestern Division.	84,713	116	24	28.3
Benzie county	9,692	21	3	31.0
Grand Traverse county	20,787	38	6	28.9
Leelanau county	10,302	5	2	19.4
Manistee county	26,995	27	7	25.9
Wexford county	16,937	25	6	35.4
Northern Division.	74,524	107	19.6	26.3
Antrim county	14,295	19	4	28.0
Charlevoix county	13,845	14	3	21.7
Cheboygan county	15,828	17	2	12.6
Crawford county	3,288	5	.6	18.2
Emmet county	14,469	27	5	34.6
Kalkaska county	6,701	9	2	29.8
Otsego county	6,098	16	3	49.2
Northeastern Division.	56,862	47	12.5	22.0
Alcona county	5,590	4	.7	12.5
Alpena county	19,024	12	4	21.0
Iosco county	11,339	8	3	26.5
Montmorency county	3,081	3	.7	22.7
Ogemaw county	7,445	9	2	26.9
Oscoda county	1,863	3	.1	5.4
Presque Isle county	8,520	8	2	23.5
Western Division.	270,960	421	81	29.9
Kent county	131,825	297	48	36.4
Lake county	5,452	6	1	18.3
Mason county	19,290	17	6	31.1
Muskegon county	37,348	26	7	18.7
Newaygo county	18,757	19	6	32.0
Oceana county	17,300	24	4	23.1
Ottawa county	40,988	32	9	22.0
Northern Central Division.	101,769	146	28.3	27.8
Clare county	8,674	12	2	23.1
Gladwin county	6,860	11	2	29.2
Isabella county	23,104	34	5	21.6
Mecosta county	20,654	23	6	29.1
Midland county	14,203	26	5	35.2
Missaukee county	8,828	21	4	45.3
Osceola county	17,774	17	4	22.5
Roscommon county	1,672	2	.3	17.9

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* † These footnotes are below Table 35, on a preceding page.

TABLE 37.—CONCLUDED.

Geographical divisions.	Average.			
	Population.*	Cases.†	Deaths.	Death rates.
BAY AND EASTERN DIVISION.	343,058	378	83.7	24.4
Arenac county	8,717	6	.7	8.0
Bay county	63,138	55	20	31.7
Huron county	34,051	29	6	17.6
Lapeer county	27,922	31	6	21.5
Saginaw county	84,110	69	16	19.0
Sanilac county	34,623	51	10	28.9
St. Clair county	55,039	98	17	30.9
Tuscola county	35,458	39	8	22.6
CENTRAL DIVISION.	315,338	414	78	24.7
Barry county	22,829	23	3	13.1
Clinton county	25,688	40	8	31.1
Eaton county	31,720	47	7	22.1
Genesee county	41,750	39	8	19.2
Gratiot county	29,777	43	8	26.9
Ingham county	41,883	90	16	38.2
Ionia county	34,874	43	9	25.8
Livingston county	19,485	21	4	20.5
Montcalm county	33,827	28	8	23.6
Shiawassee county	33,505	40	7	20.9
SOUTHWESTERN DIVISION.	140,712	152	32	22.7
Allegan county	39,107	29	7	17.9
Berrien county	47,950	50	12	25.0
Cass county	20,604	25	4	19.4
Van Buren county	33,051	48	9	27.2
SOUTHERN CENTRAL DIVISION.	318,281	394	70	22.0
Branch county	26,234	30	6	22.9
Calhoun county	50,633	70	13	25.7
Hillsdale county	29,988	23	5	16.7
Jackson county	47,004	79	12	25.5
Kalamazoo county	46,223	81	11	23.8
Lenawee county	48,829	60	11	22.5
St. Joseph county	24,114	20	5	20.7
Washtenaw county	45,256	31	7	15.5
SOUTHEASTERN DIVISION.	454,319	296	116	25.5
Macomb county	32,792	40	8	24.4
Monroe county	33,100	36	7	21.1
Oakland county	44,325	31	7	15.8
Wayne county	344,102	189	94	27.3

* † These footnotes are below Table 35, on a preceding page.

THE PREVALENCE OF TYPHOID FEVER IN URBAN AND RURAL LOCALITIES.

Table 38 indicates that, in 1908, typhoid fever was more prevalent in urban than in rural localities.

In the urban localities, typhoid fever was most prevalent in the group of localities having populations of from 10,000 to 25,000, and least prevalent in the group having populations of less than 5,000.

By comparison of death rates in Table 38 with the death rate from typhoid fever, in 1908, for the State as a whole, shown in Table 35, it will be seen that the death rates for the second and third groups of localities in Table 38 are considerably higher than the rate for the entire State.

The localities in each of the first four groups in Table 38, together with the reported cases and deaths from typhoid fever in each locality, in 1908 and in the average year, are shown in Table 38A.

By Table 38A, it may be seen that, in 1908, the urban localities which showed much higher death rates from typhoid fever than the death rate for this disease for the entire State for that year were: Alpena, Battle Creek, Bay City, Big Rapids, Cadillac, Escanaba, Flint, Hancock, Ironwood, Kalamazoo, Lansing, Ludington, Manistee, Manistique, Marquette, Menominee, Mt. Clemens, Mt. Pleasant, Negaunee, Owosso, Petoskey, Sault Ste. Marie, Traverse City and Wyandotte.

The localities, shown in Table 38A, in which the death rates from typhoid fever were much lower in 1908 than the rate for the entire State for that year were: Adrian, Albion, Ann Arbor, Calumet township, Cheboygan, Hillsdale, Holland, Ionia, Iron Mountain, Jackson, Laurium, Monroe, Norway, Pontiac, Port Huron and St. Joseph.

The localities, shown in Table 38A, which showed much higher death rates from typhoid fever in 1908 than the average for such localities in the years 1904-7, were: Albion, Alpena, Battle Creek, Benton Harbor, Big Rapids, Flint, Hancock, Kalamazoo, Ludington, Manistee, Manistique, Mt. Pleasant, Owosso, Petoskey, Sault Ste. Marie and Traverse City.

The localities, shown in Table 38A, which showed much lower death rates from typhoid fever in 1908 than the average for such localities in the years 1904-7, were: Adrian, Calumet township, Escanaba, Grand Rapids, Hillsdale, Ionia, Iron Mountain, Jackson, Menominee, Mt. Clemens, Pontiac and Port Huron.

By Table 38B, is shown the number of cases that would have been expected to occur in 1908, in cities of over 5,000 inhabitants, according to an estimated rate of 10 deaths to each 100 cases. This table is merely an experiment yet it may prove of value, as the future will show.

TABLE 38.—*The prevalence of typhoid fever in urban and rural localities, in Michigan, in 1908.*

Localities—grouped according to density of population.	Population.*	Health jurisdictions.			Cases.†	Deaths.	Death rates per 100,000 of the population.
		Total.	Infected.				
			Number.	Per cent of all jurisdictions.			
Cities over 50,000	512,905	3	3	100	415	142	27.7
Cities from 25,000 to 50,000	126,978	4	4	100	178	54	42.5
Cities from 10,000 to 25,000 and Calumet township (18,261)	233,222	16	16	100	302	104	44.6
Cities and villages from 5, 000 to 10,000	188,759	28	27	96	239	62	32.8
Cities and villages under 5,000‡	354,646	329	137	42	469	97	27.4
Total urban	1,416,510	380	187	49	1,603	459	32.4
Balance of localities—principally townships§	1,222,540	1,278	455	36	1,053	270	22.1

*† These footnotes are below Table 35, on a preceding page.

‡ Exclusive of fifty-two cities and villages, for which the population in 1908 cannot be correctly estimated.

§ Includes the fifty-two cities and villages mentioned in the preceding paragraph, but does not include Calumet township, which, for the purpose of this study, is included in the third group of urban localities, which have corresponding populations.

TABLE 38A.—*The prevalence of typhoid fever in 1908, and preceding years, in each of the principal localities included in the first four groups in Table 38.*

Localities.	1908.				Average, 1904-1907.			
	Population.*	Cases.	Deaths.	Deaths per 100,000 inhabitants.	Population.*	Cases.	Deaths.	Deaths per 100,000 inhabitants.
Adrian	11,706	7	2	17.1	11,065	†	3	27.1
Albion	5,367	7	1	18.6	5,102	5	.3	5.9
Alpena	12,998	†	10	76.9	12,625	†	5	39.6
Ann Arbor	14,689	8	2	13.6	14,631	10	2	13.7
Battle Creek	25,863	42	12	46.4	23,582	44	8	33.9
Bay City	40,535	†	22	54.3	37,352	†	‡17	45.5
Benton Harbor	6,842	4	2	29.2	6,755	4	1	14.8
Big Rapids	5,018	6	3	59.8	4,915	4	2	40.7
Cadillac	7,789	18	4	51.4	7,229	20	3	41.5
Calumet township	18,261	14	1	5.5	17,702	19	3	16.9
Charlotte	5,360	2	0	....	4,964	10	1	20.1
Cheboygan	6,971	1	1	14.3	6,821	4	.8	11.7
Coldwater	6,234	1	0	....	6,229	6	.5	8.0
Detroit	358,159	148	94	26.2	333,504	†	85	25.5
Escanaba	12,647	27	17	134.4	11,679	†	25	214.1
Flint	16,665	16	13	78.0	15,552	10	6	38.6
Grand Haven	5,735	4	0	....	5,425	4	1	18.4
Grand Rapids	103,871	193	33	31.8	98,776	431	47	47.6
Hancock	8,024	†	5	62.3	6,782	†	2	29.5
Hillsdale	5,467	7	1	18.3	5,056	5	2	39.6
Holland	10,142	7	1	9.9	9,407	8	1	10.6
Houghton	5,333	0	0	....	4,715	†	.5	10.6
Ionia	5,235	11	1	19.1	5,227	§9	3	57.4
Iron Mountain	7,928	†	1	12.6	8,339	†	2	24.0
Ironwood	10,333	†	5	48.4	10,137	†	5	49.3
Ishpeming	9,991	5	0	....	11,011	8	2	18.2
Jackson	25,420	53	5	19.7	25,345	77	10	39.5
Kalamazoo	35,160	61	15	42.7	31,799	70	8	25.2
Lansing	24,067	55	15	62.3	21,698	§46	11	50.7
Laurium	9,664	†	2	20.7	8,407	†	2	23.8
Ludington	7,352	†	4	54.4	7,294	4	1	13.7
Manistee	11,156	22	4	35.9	12,126	14	3	24.7
Manistique	5,066	8	3	59.2	4,773	3	1	21.0
Marquette	11,272	17	6	53.2	10,893	19	6	55.1
Menominee	9,374	†	6	64.0	10,451	†	11	105.3
Monroe	7,213	1	1	13.9	6,535	2	1	15.3
Mt. Clemens	7,640	†	3	39.3	7,308	¶16	4	54.7
Mt. Pleasant	5,306	34	2	37.7	4,793	11	1	20.9
Muskegon	20,976	19	7	33.4	20,927	21	6	28.7
Negaunee	6,659	31	4	60.1	6,746	13	4	59.3
Norway	5,558	7	1	18.0	5,125	4	.8	15.6
Owosso	9,594	†	4	41.7	9,314	5	2	21.5
Petoskey	5,087	18	5	98.3	5,149	12	1	19.4
Pontiac	11,999	4	1	8.3	11,302	†	3	26.5
Port Huron	20,898	11	3	14.4	20,355	26	9	44.2
Saginaw	50,875	74	15	29.5	48,210	45	16	33.2
St. Joseph	5,489	7	1	18.2	5,385	4	1	18.6
Sault Ste. Marie	12,346	33	9	72.9	11,781	16	5	42.4
Traverse City	13,067	47	8	61.2	11,924	58	5	41.9
Wyandotte	5,667	35	7	123.5	5,516	†	6	108.8
Ypsilanti	7,796	9	0	....	7,666	2	1	13.0

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* Estimated for intercensal years.

† Fatal cases only reported.

‡ Does not include West Bay City for 1904, which was consolidated with Bay City in 1905.

§ Average for three years only.

¶ Average for two years only.

TABLE 38B.—*The number of cases and deaths from typhoid fever reported from each of certain localities of 5,000 inhabitants and over, in Michigan, in 1908, together with the fatality, deaths per 100 reported cases, and the number of cases that would be expected to occur according to a rate of ten deaths to each 100 cases.*

Localities.	Reported cases.	Deaths.	Deaths per 100 reported cases.	The expected number of cases.
Adrian	7	2	29	20
Albion	7	1	14	10
Alpena	10	10	100	100
Ann Arbor	8	2	25	20
Battle Creek	42	12	29	120
Bay City	22	22	100	220
Benton Harbor	4	2	50	20
Big Rapids	6	3	50	30
Cadillac	18	4	22	40
Calumet township	14	1	7	10
Detroit	148	94	64	940
Escanaba	27	17	63	170
Flint	16	13	81	130
Grand Rapids	193	33	17	330
Hancock	5	5	100	50
Hillsdale	7	1	14	10
Holland	7	1	14	10
Ionia	11	1	9	10
Ironwood	5	5	100	50
Jackson	53	5	9	50
Kalamazoo	61	15	25	150
Lansing	55	15	27	150
Ludington	4	4	100	40
Laurium	2	2	100	20
Manistee	22	4	18	40
Manistique	8	3	38	30
Marquette	17	6	35	60
Menominee	6	6	100	60
Mt. Clemens	3	3	100	30
Mt. Pleasant	34	2	6	20
Muskegon	19	7	37	70
Negaunee	31	4	13	40
Norway	7	1	14	10
Owosso	4	4	100	40
Petoskey	18	5	28	50
Pontiac	4	1	25	10
Port Huron	11	3	27	30
Saginaw	74	15	20	150
St. Joseph	7	1	14	10
Sault Ste. Marie	33	9	27	90
Traverse City	47	8	17	80
Wyandotte	35	7	20	70

THE REPORTED SOURCES OF CONTAGIUM IN TYPHOID FEVER.

In the eighteen years, 1891-1908, over sixty-five per cent of all the cases of typhoid fever were not traced to their source. This is to be regretted, because if in any outbreak of typhoid fever, the source of the disease is promptly located and removed, and proper measures taken to prevent the further spread of the disease from the sick person, or persons, the disease may usually be restricted to those persons who were infected prior to the recognition of the disease at the beginning of the outbreak.

Of the cases of typhoid fever in which a source of contagium was given, as shown in Table 39, fifty-seven per cent were said to be due to water or ice. This number would be much greater if the sources of all the cases were traced. For instance, in Grand Rapids, which has a contaminated public water supply, there are several hundred cases of typhoid fever in each year, most of which are undoubtedly due to the water supply, and yet a source is not usually reported. This is also true of many other localities in which the water supplies are the undoubted sources of the typhoid fever, but the connection is not traced or reported to this Department.

The comparatively large number of cases in which the infection was traced to outside jurisdictions, included, principally, those cases in which the patients were taken sick in a camp, or other place, away from home, and were removed to their homes, or to a hospital, in other health jurisdictions, to be cared for. The localities from which and to which typhoid fever was spread in 1908 are shown in Table 40.

The removal, from one locality to another, of a person suffering from typhoid fever is a dangerous practice, and is unlawful unless the same is done with the consent and under the supervision of the health officials of the locality to which the patient is to be removed.

The 2,714 cases which were said to be due to coming in contact with or nursing typhoid fever patients were probably due, in the main, to the neglect of proper precautions on the part of those in attendance upon the patients. Where the utmost care and cleanliness is observed by those in charge of cases of typhoid fever, cases due to secondary infection should be of rare occurrence. It often happens, however, that the nursing is done by some member of the family, who may also handle food, or assist in the preparation of meals, to be eaten by herself and other members of the family; and the hands may not always be disinfected and cleansed between the act of caring for the patient and the handling of the food.

It is probable that many of the cases of typhoid fever which occurred in the same household, camp, etc., and which were reported as due to secondary infection, were really due to the same source as the original case, or to primary infection.

An insanitary condition of premises, on which a case of typhoid fever occurred, would be considered a cause of typhoid fever only in so far as it might assist in the development and distribution of the germs of the disease. Thus, a badly constructed or neglected privy or cesspool might be an eyesore or a source of discomfort to those in the immediate vicinity for many years, and yet not be a cause of typhoid fever. Further, the leachings from such privy or cesspool might find their way into and contaminate the water supply, and the water be consumed without any apparent danger to those using it. But with the entrance to such privy or cesspool of the discharges from a person suffering, or recently recovered, from typhoid fever, these receptacles would then become centers of infection, and a positive danger to those living in their immediate vicinity, and to those using the water from any source into which the leachings from such receptacles might find their way. It is probable that very many of the 1,433 cases of typhoid fever in Table 39, attributed to insanitary surroundings, were due to infected water, and, in some instances, to infected milk or other food.

Cases of typhoid fever due to infected food are difficult to trace, and it is probable that the one per cent of cases, shown in Table 39, attributed to this source, does not nearly represent the actual number of cases resulting therefrom.

The cases of typhoid feved due to milk infection are probably represented to a considerable extent by the number of deaths from this disease in children under five years of age; and which constitute about four and one-half per cent of all the deaths from this disease.

The transmission of typhoid fever by flies is believed to play a more important part in the spreading of this disease than is generally supposed, but the connection between this source and individual cases of the disease cannot ordinarily be traced by those in charge of the public health service of the State. Wherever a common privy exists, there will always be a possibility of the infection of the contents of the pit by the discharges from an incipient or ambulatory case of typhoid fever, and a strong probability of its infection during and for some time subsequent to an outbreak of this disease on the premises where the privy is located. As there is little, if any, effort made to exclude the common house-fly from the common privies, and, in many instances, a very imperfect exclusion of them from our homes, from stores where articles of food are exposed for sale, and from the rooms where cases of typhoid fever are present, the probability of infection of food in the home and in the store is ever present.

It is possible that some of the 23 cases of typhoid fever, in Table 39, attributed to infected houses and articles of clothing, etc., were really due to infection in a well, privy or cesspool, rather than to infection in the house itself.

TABLE 39.—*The principal reported sources of contagium in 18,792 cases of typhoid fever, in Michigan, in the eighteen years, 1891-1908.*

Reported sources.	Number of cases.	Per cent of cases in which the source was known.
Water and ice	10,713	57.0
Outside jurisdictions	3,615	19.2
Traced to former cases in same locality	2,714	14.4
Insanitary surroundings, defective sewerage, filth, etc.	1,433	7.6
Milk and other foods	247	1.3
Flies	47	.3
Infected houses and articles of clothing, etc	23	.1
Sources not stated or doubtful	36,005	*65.7

* Per cent of all cases which were reported.

TABLE 40.—*Typhoid Fever in Michigan. Localities from which and to which the disease was spread, during the year 1908.*

Spread from:	To:	Spread from:	To:
Allegan county, Allegan city.	Allegan county, Heath township.	Chippewa county Sugar Island township.	Chippewa county, Sault Ste. Marie city.
Alpena county, Alpena city.	Iosco county, Au Sable township.	Clare county, Clare city.	Washtenaw county Saline township.
Antrim county, Elk Rapids village.	Antrim county, Milton township.	Clare county, (No locality given.)	Isabella county, Vernon township.
Antrim county, (No locality given.)	Kalkaska county, Excelsior township.	Clinton county, Ovid township.	Hillsdale county, Ransom township.
Bay county, Bay City.	Huron county, McKinley township.	Clinton county, St. Johns city.	Ionia county, Ionia city.
Benzie county, Frankfort village.	Gladwin county, Bentley township.	Crawford county, (No locality given.)	Midland county, Jasper township.
Benzie county. Platte township.	Benzie county, Homestead township.	Delta county, Escanaba city.	Delta county, Ford River township.
Calhoun county, Albion city.	Jackson county, Leoni township.	Delta county, Escanaba city.	Menominee county, Nadeau township.
Calhoun county, Battle Creek city.	Eaton county, Walton township.	Dickinson county, Sagola township.	Marquette county, Republic township.
Calhoun county, Battle Creek city.	Jackson county, Grass Lake township.	Eaton county, Charlotte city.	Branch county, Sherwood village.
Charlevoix county, Boyne Falls village.	Emmet county, Petoskey city.	Eaton county, Eaton Rapids city.	Calhoun county, Homer village.
Cheboygan county, (No locality given.)	Alpena county, Long Rapids township.	Eaton county, Eaton Rapids city.	Jackson county, Parma village.
Cheboygan county, Nunda township.	Otsego county, Bagley township.	Emmet county, Alanson village.	Emmet county, Petoskey city.
Cheboygan county, Nunda township.	Otsego county, Gaylord village.	Emmet county, Petoskey city.	Benzie county, Inland township.
Chippewa county, Bruce township.	Chippewa county, Sault Ste. Marie city.	Genesee county, Atlas township.	Oakland county, Ortonville village.
Chippewa county, Rudyard township.	Chippewa county, Sault Ste. Marie city.	Genesee county, Flint city.	Genesee county, Genesee township.

TABLE 40.—CONTINUED.

Spread from:	To:	Spread from:	To:
Grand Traverse county, Green Lake township.	Gratiot county, Ashley village.	Kent county, Grand Rapids city.	Barry county, Rutland township.
Gratiot county, Alma city.	Jackson county, Sandstone township.	Kent county, Grand Rapids city.	Grand Traverse county, Peninsula township.
Gratiot county, Ithaca village.	Gratiot county, Breckenridge village.	Kent county, Grand Rapids city.	Ionia county, Ionia city.
Gratiot county, New Haven township.	Gratiot county, Newark township.	Kent county, Grand Rapids city.	Kent county, Algoma township.
Gratiot county, New Haven township.	Montcalm county. Crystal township.	Kent county, Grand Rapids city.	Kent county, Gaines township.
Ionia county, Portland village.	Ingham county, Williamston village.	Kent county, Grand Rapids city.	Kent county, Vergennes township.
Jackson county, Concord township.	Jackson county, Jackson city.	Kent county. Grand Rapids city.	Montcalm county, Cato township.
Jackson county, Jackson city.	Jackson county, Henrietta township.	Kent county, Grand Rapids city.	Montcalm county, Evergreen township.
Jackson county, Jackson city.	Jackson county, Springport township.	Kent county, Grand Rapids city.	Muskegon county, Muskegon city.
Kalamazoo county, Alamo township.	Van Buren county, Pine Grove township.	Kent county, Grand Rapids city.	Ottawa county, Crockery township.
Kalamazoo county, Kalamazoo city.	Barry county, Rutland township.	Kent county, Grand Rapids city.	Ottawa county, Spring Lake village.
Kalamazoo county, Kalamazoo city.	Cass county, Dowagiac city.	Kent county, Grand Rapids city.	Van Buren county, Bangor village.
Kalkaska county, Cold Springs township.	Lake county, Dover township.	Kent county, Grand Rapids city.	Van Buren county, Pine Grove township.
Kalkaska county, Excelsior township.	Kalkaska county, Kalkaska village.	Livingston county, Iosco township.	Ingham county, White Oak township.
Kalkaska county, (No locality given.)	Antrim county, Elk Rapids village.	Manistee county, Manistee city.	Manistee county, Bear Lake village.
Kent county, Grand Rapids city.	Barry county, Irving township.	Manistee county, (No locality given.)	Wexford county, Springville township.

TABLE 40.—CONTINUED.

Spread from:	To:	Spread from:	To:
Mecosta county, Big Rapids city.	Grand Traverse county, Fife Lake village.	Shiawassee county, Durand village.	Kalamazoo county, Kalamazoo city.
Missaukee county, Lake township.	Wexford county, Cedar Creek township.	Shiawassee county. Owosso city.	Lenawee county, Fairfield township.
Monroe county, Monroe city.	Monroe county, La Salle township.	Shiawassee county, Owosso city.	Shiawassee county, Laingsburg village.
Osceola county, Marion village.	Gratiot county, Emerson township.	Van Buren county, Antwerp township.	Van Buren county, Gobleville village.
Osceola county, (No locality given.)	Wexford county, Cadillac city.	Van Buren county, Bloomingdale township.	Van Buren county, Paw Paw village.
Saginaw county, Saginaw city.	Gladwin county, Gladwin city.	Van Buren county, Lawton village.	Kalamazoo county, Kalamazoo city.
Saginaw county, Saginaw city.	Isabella county, Vernon township.	Van Buren county, Lawton village.	Van Buren county, Pine Grove township.
Saginaw county, Saginaw city.	Saginaw county, Kochville township.	Van Buren county, Pine Grove township.	Kalamazoo county, Kalamazoo city.
Saginaw county, Zilwaukee township.	Saginaw county, Saginaw city.	Wayne county, Detroit city.	Calhoun county, Albion city.
St. Clair county. Marine City city.	Macomb county, New Baltimore village.	Wayne county, Detroit city.	Chippewa county, Bruce township.
St. Clair county, Port Huron township.	St. Clair county, Clay township.	Wayne county, Detroit city.	Isabella county, Isabella township.
Sanilac county, Bridgehampton township.	Sanilac county, Washington township.	Wayne county, Detroit city.	Jackson county, Parma village.
Sanilac county, Buel township.	Sanilac county, Marion township.	Wayne county, Detroit city.	Lapeer county, Imlay City village.
Sanilac county, Elmer township.	Sanilac county, Lamotte township.	Wayne county, Detroit city.	Washtenaw county, Ann Arbor city.
Sanilac county, (No locality given.)	St. Clair county, Yale city.	Wayne county, Detroit city.	Washtenaw county, Ypsilanti city.
Sanilac county, Sandusky city.	Sanilac county, Marlette village.	Wayne county, Detroit city.	Wayne county, Northville township.

TABLE 40.—CONTINUED.

Spread from:	To:	Spread from:	To:
Washtenaw county, Ann Arbor city.	Washtenaw county, Webster township.	Illinois, Chicago,	Ottawa county, Crockery township.
Washtenaw county, Augusta township.	Washtenaw county, Ypsilanti township.	Illinois, Chicago.	St. Joseph county, White Pigeon village.
Wexford county, (No locality given.)	Kalkaska county, Springfield township.	Illinois, Chicago.	Van Buren county, South Haven city.
FROM OUTSIDE THE STATE TO LOCALITIES IN MICHIGAN.		Illinois, Rock Island.	Washtenaw county, Milan village.
Arkansas, (No locality given.)	Eaton county, Charlotte city.	Indiana, Gary.	Ottawa county, Allendale township.
California, (No locality given.)	Grand Traverse county, Traverse City city.	Indiana, Lottsville.	Macomb county, Chesterfield township.
Canada, Amherstburg.	Chippewa county, Sault Ste. Marie city.	Indiana, (No locality given.)	Calhoun county, Albion city.
Canada, Latoque.	Chippewa county, Sault Ste. Marie city.	Indiana, (No locality given.)	Kalamazoo county, Kalamazoo city.
Canada, (No locality given.)	Dickinson county, Norway city.	Indiana, South Bend.	Berrien county, Coloma village.
Canada, (No locality given.)	Gladwin county, Tobacco township.	Louisana, (No locality given.)	Kent county, Gaines township.
Florida, (No locality given.)	Kalamazoo county, Kalamazoo city.	Minnesota, Minneapolis.	Berrien county, Buchanan village.
Illinois, Chicago.	Allegan county, Ganges township.	Missouri, (No locality given.)	Bay county, Fraser township.
Illinois, Chicago.	Branch county, Kinderhook township.	New York, (No locality given.)	Wexford county, Cadillac city.
Illinois, Chicago.	Emmet county, Harbor Springs village.	New York. Rochester.	Wayne county, Wyandotte city.
Illinois, Chicago.	Kalamazoo county, Kalamazoo city.	Ohio, Cleveland.	Lenawee county, Fairfield township.

TABLE 40.—CONCLUDED.

Spread from:	To:
Ohio, Grand Rapids.	Barry county, Maple Grove township.
Ohio, Toledo.	Hillsdale county, Wright township.
Ohio, Toledo.	Livingston county, Brighton village.
Pennsylvania, Bradford.	Ingham county, East Lansing city.
Pennsylvania, Pitkin.	Ottawa county, Holland city.
Tennesee, Chattanooga.	Washtenaw county, Ypsilanti city.
Wisconsin, Niagara.	Dickinson county, Norway city.

RESTRICTIVE AND PREVENTIVE MEASURES.

Table 41 indicates that, in 1905-8, in a large number of instances, the disinfection of the discharges, and of clothing and other articles soiled by the discharges, of typhoid fever patients, was enforced. This is very gratifying, because it is through the discharges that the disease is spread. This does not, however, include the discharges from patients prior to the recognition of the disease and for some time subsequent to apparent recovery, nor the discharges from ambulatory cases which are seldom, if ever, recognized, all of which are believed to be fruitful sources of the disease.

The disinfection of rooms in which the patients were sick was enforced in 71 per cent of the cases. This shows a much greater recognition of the importance of this precautionary measure than was reported in the single year 1905.

Judging by the per cent of cases in which the isolation of the patient was enforced, the necessity for this restrictive measure is quite generally recognized. This is also true, though to a less extent, in respect to the placarding of premises. It is sometimes urged that if proper precautions are taken in the care of typhoid fever patients the isolation of the sick and the placarding of premises are not necessary. To this it should be stated, that inasmuch as strict precautions are not always observed in such cases, and for the further reason that many prominent medical men, in this and other countries, are advocates of the theory of the communicability of typhoid fever directly from patient to nurse, and to others who may come in contact with them, members of the families of those sick, other than those who may be in attendance upon the sick, should be excluded from the sick room, and the public should be warned against visiting the houses, and especially against drinking the water from any wells or making use of any outhouses on the premises where the disease is present.

As indicated in the footnote of Table 41, the boiling of the drinking water, in cases where the water supplies were believed to have been the sources of the typhoid fever, was carried out in less than one-third of the cases. The boiling of suspected water, for drinking and domestic purposes, does not entail much time or labor, and is an absolute safeguard against the communication of typhoid fever through this agency. There is an objection, however, especially in very warm weather, to the drinking of water which has been boiled and thus rendered insipid, but the protection which the boiling affords should more than offset any objection of this nature.

In 1908, a question relative to the source of water supply for domestic purposes, in outbreaks of typhoid fever, was added to the blanks for the Health Officer's Final Report to this Department, and the following information, relative to this question, was obtained: Tubular wells, 1,208, public water 654, surface wells 81, flowing wells 50, springs 43 and creeks 18.

In April, 1907, it was recommended by this Department that all privies used by typhoid fever patients should be disinfected, and this question was added to the final report of cases of typhoid fever. Judging from the per cent of cases in which this restrictive measure was carried out in 1908, 71 per cent, its necessity is quite generally recognized.

Following are some of the many inquiries relative to restrictive measures in typhoid fever, received by this Department, during the past year, together with the replies to the same:

Question.—Should children be permitted to attend school when typhoid fever exists in their households?

Answer.—Yes, provided the patient and nurse are kept isolated and the discharges from the patient, in fact, everything coming from the sick room, is disinfected. If these restrictive measures are neglected, the children should not be allowed to attend school.

Question.—Should parents, whose labors take them away from home, be allowed to work when typhoid fever exists in their households?

(The answer to the first question will apply with equal force to this one.)

Question.—Is it allowable to dispose of milk to creameries, or otherwise, while a case of typhoid fever exists on the premises?

Answer.—Yes, provided that it is ascertained, beyond a doubt, that the source of infection is not due to the well water on the premises, as there would be danger of infecting the cans in which the milk is shipped, as undoubtedly they would be washed or rinsed in this water, and again, if the cows were allowed to drink the water, there would be danger of milk infection.

TABLE 41.—*Restrictive and preventive measures in typhoid fever, in Michigan, in the four years, 1905-1908.*

Restrictive and preventive measures.	Number of cases.	Per cent of all cases.
PLACARDING OF PREMISES:		
Enforced	6,654	*64
Neglected, not stated or statements doubtful	3,812	*36
ISOLATION OF SICK PERSONS:		
Enforced	7,781	74
Neglected	1,025	10
Not stated or statements doubtful	1,740	16
DISCHARGES FROM THE BOWELS AND BLADDER:		
Disinfected	8,375	79
Not disinfected	405	4
Not stated or statements doubtful	1,766	17
CLOTHING AND OTHER ARTICLES SOILED BY DISCHARGES:		
Disinfected	8,707	83
Not disinfected	210	2
Not stated or statements doubtful	1,629	15
INFECTED ROOMS:		
Disinfected	7,435	71
Not disinfected	1,138	11
Not stated or statements doubtful	1,973	18
DRINKING WATER:		
Boiled during the period of sickness	†441	52
Not boiled	†321	38
Not stated or statements doubtful	†84	10
PROTECTION AGAINST FLIES:		
Houses screened during fly time	‡4,879	68
Not screened	‡728	10
Not stated or statements doubtful	‡1,553	22

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* Placarding was not considered necessary in 80 instances, in which the patients were confined in hospitals or pest houses, therefore this number has been deducted from the 10,546 cases reported during the four years, before making these per cents.

† These figures represent the number of cases which were definitely traced, or believed to have been due to drinking infected water.

‡ Of the 10,546 cases of typhoid fever in the four years, 1905-1908, 3,386 occurred in months when there were no flies, consequently no necessity for screening; therefore, the 3,386 cases are not included in these figures.

SPECIAL INVESTIGATIONS, BY THE SECRETARY OF THIS BOARD, IN 1908, OF OUTBREAKS OF TYPHOID FEVER.

Upon the invitation of the local authorities, in 1908, the Secretary of this Board made visits to the undermentioned localities, on the dates named, for the purpose of making investigation relative to outbreaks of typhoid fever:

St. Clair, April 7.—The fact that there were fifty or sixty cases of the disease pointed to a general source of contagium, and suspicion at once rested upon the public water supply, which is obtained from the St. Clair river. Samples of water taken from the river near the mouth of the intake pipe, from the settling tank, and from three faucets in different parts of the city where typhoid fever was present, were analyzed in the Laboratory of this Department and were found to be contaminated in every instance. A thorough inspection of the water works and the installation of a filtration plant were recommended. Pending radical changes in the water supply, the necessity for boiling the drinking water was urged upon the people.

Eaton Rapids, July 28.—A number of cases in this outbreak occurred in the same street and vicinity. Analyses of the city water, made in the Laboratory of the Department, showed the same to be above suspicion, and the attention of the city authorities was directed to certain insanitary conditions which might be considered as probable sources of the disease.

DIPHTHERIA AND CROUP IN MICHIGAN IN 1908 AND PRECEDING YEARS.

GENERAL PREVALENCE.

During the year 1908, diphtheria was reported present in 1,995 households, with totals of 2,658 cases and 327 deaths, an average of 1.33 cases and .16 deaths per household.

In 1908, compared with the average for the fourteen years, 1894-1907, the number of cases were 489 and the deaths 231 less.

By reference to Table 42, it may be seen that in the fifteen years, 1894-1908, the average number of cases and deaths, the average deaths per 100 cases and the average death rate per 100,000 of the population, were much less than the average for the ten preceding years. The reason for this decrease will be considered in connection with Table 50, on a subsequent page of this article.

Going back still further, by reference to Table 43, we find that in the 15 years, 1869-1883, the average death rate was about 58.5 per 100,000 of the population, a rate not equalled in any subsequent year. This high rate was due to the unusual rates for each of the years 1879-1882, the maximum of 145.2 deaths per 100,000 being reached in 1881. In the last year named, active measures for the restriction of diphtheria were begun by the State Department of Health, and the Tables 42 and 43 show a much lower death rate for each year since that time, especially in the last ten years.

TABLE 42.—*The prevalence of diphtheria, in Michigan, during the ten years, 1884-1893, and before the use of antitoxin; also a similar statement for the fifteen years, 1894-1908, since the beginning of the general use of antitoxin.*

Years.	Population.*	Reported cases.	Reported deaths.	Deaths per 100 cases.	Deaths per 100,000 population.
1884	1,853,658	3,915	905	23.1	48.8
1885	1,893,697	4,018	964	24.0	50.9
1886	1,933,735	4,244	982	23.1	50.8
1887	1,973,774	3,382	825	24.4	41.8
1888	2,013,812	2,228	532	23.9	26.4
1889	2,053,851	3,157	683	21.6	33.3
1890	2,093,889	4,206	1,050	25.0	50.1
1891	2,130,827	4,385	1,002	22.9	47.0
1892	2,167,765	4,818	1,099	22.8	50.7
1893	2,204,703	4,736	1,092	23.1	49.5
Averages 1884-1893	2,031,971	3,909	913	23.4	44.9
1894	2,241,641	3,852	744	19.3	33.2
1895	2,271,531	3,433	708	20.6	31.2
1896	2,301,421	4,013	757	18.9	32.9
1897	2,331,311	4,132	756	18.3	32.4
1898	2,361,201	2,357	477	20.2	20.2
1899	2,391,091	2,154	435	20.2	18.2
1900	2,420,982	2,706	528	19.5	21.8
1901	2,450,872	2,498	493	19.7	20.1
1902	2,475,499	2,993	500	†16.4	20.2
1903	2,502,758	3,670	569	15.5	22.7
1904	2,530,016	3,510	538	15.3	21.3
1905	2,557,275	2,159	465	21.5	18.2
1906	2,584,533	3,648	453	12.4	17.5
1907	2,611,792	2,935	388	13.2	14.9
1908	2,639,050	2,658	327	12.3	12.4
Averages 1894-1908	2,444,732	3,115	543	17.4	22.2

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* Estimated for intercensal years.

† Exclusive of the cases in the cities of Muskegon and Sault Ste. Marie, from which only the fatal cases were reported in this year.

TABLE 43.—*The number of deaths from diphtheria and croup, in Michigan, per 100,000 persons living, in each of the fifteen years, 1869-1883. Compiled from reports to the Secretary of State.*

Years	1869.	1870.	1871.	1872.	1873.	1874.	1875.	1876.	1877.	1878.	1879.
Deaths	17.0	20.9	22.5	28.2	29.6	26.2	26.9	34.7	50.6	72.8	110.5

Years	1880.	1881.	1882.	1883.	Average. 1869-1883.
Deaths	113.9	145.2	102.1	75.7	58.5

GEOGRAPHICAL DISTRIBUTION IN DIPHTHERIA.

Table 44 shows that, as indicated by the number of deaths per 100,000 inhabitants in the eighteen years, 1891-1908, diphtheria was much more prevalent than the average for the entire State (26.2 per 100,000 inhabitants) in the Northeastern and Southeastern Divisions.

The counties in which the death rates from diphtheria were unusually high in the eighteen years, 1891-1908, are:

Roscommon*	with a death rate of	119.6	per 100,000
Wayne	" " " " "	54.3	" "
Alcona	" " " " "	53.7	" "
Gogebic	" " " " "	49.9	" "
Otsego	" " " " "	49.2	" "
Presque Isle	" " " " "	46.9	" "
Cheboygan	" " " " "	44.2	" "
Bay	" " " " "	42.8	" "
Midland	" " " " "	42.2	" "
Alpena	" " " " "	42.1	" "
Huron	" " " " "	38.2	" "
Marquette	" " " " "	37.8	" "
Lake	" " " " "	36.7	" "
Iosco	" " " " "	35.3	" "
Dickinson	" " " " "	35.0	" "
Arenac	" " " " "	34.4	" "
Macomb	" " " " "	33.5	" "

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* The amazingly high death rate in this county was due to an outbreak of so-called sore throat in 1893, of which the particulars were given in the annual report of this Department for 1894. The high rates in other counties were due, in the main, to epidemics in one or more of the eighteen years for which the rates are computed.

TABLE 44.—*The geographical distribution of diphtheria, in Michigan, in the eighteen years, 1891-1908, as indicated by the average number of cases and deaths, and the average deaths per 100,000 persons living, in each geographical division shown in the table.*

Geographical divisions.	Average.			
	Population.*	Cases.†	Deaths.	Death rates.
UPPER PENINSULAR DIVISION.	245,472	384.6	66.8	27.2
Alger county	4,888	4	.7	14.3
Baraga county	4,788	1	.2	4.2
Chippewa county	19,112	15	5	26.2
Delta county	23,618	22	4	16.9
Dickinson county	17,167	35	6	35.0
Gogebic county	16,042	43	8	49.9
Houghton county	58,346	80	14	24.0
Iron county	7,530	11	2	26.6
Keweenaw county	3,619	4	.8	22.1
Luce county	3,147	.6	.2	6.4
Mackinac county	7,775	5	.9	11.6
Marquette county	39,637	103	15	37.8
Menominee county	25,178	38	6	23.8
Ontonagon county	6,556	15	2	30.5
Schoolcraft county	8,069	8	2	24.8
NORTHWESTERN DIVISION.	84,713	85	14.8	17.5
Benzie county	9,692	8	.8	8.3
Grand Traverse county	20,787	20	4	19.2
Leelanau county	10,302	15	2	19.4
Manistee county	26,995	24	5	18.5
Wexford county	16,937	18	3	17.7
NORTHERN DIVISION.	74,524	83	17.6	23.6
Antrim county	14,295	6	2	14.0
Charlevoix county	13,845	8	2	14.4
Cheboygan county	15,828	38	7	44.2
Crawford county	3,288	3	.7	21.3
Emmet county	14,469	5	.9	6.2
Kalkaska county	6,701	12	2	29.8
Otsego county	6,098	11	3	49.2
NORTHEASTERN DIVISION.	56,862	105	21.1	37.1
Alcona county	5,590	12	3	53.7
Alpena county	19,024	42	8	42.1
Iosco county	11,339	22	4	35.3
Montmorency county	3,081	5	1	32.5
Ogemaw county	7,445	6	.8	10.7
Oscoda county	1,863	2	.3	16.1
Presque Isle county	8,520	16	4	46.9
WESTERN DIVISION.	270,960	365	65	24.0
Kent county	131,825	215	37	28.1
Lake county	5,452	10	2	36.7
Mason county	19,290	19	4	20.7
Muskegon county	37,348	60	10	26.8
Newaygo county	18,757	9	2	10.7
Oceana county	17,300	12	3	17.3
Ottawa county	40,988	40	7	17.1
NORTHERN CENTRAL DIVISION.	101,769	114	20.3	19.9
Clare county	8,674	9	2	23.1
Gladwin county	6,860	2	.3	4.4
Isabella county	23,104	24	3	13.0
Mecosta county	20,654	15	3	14.5
Midland county	14,203	35	6	42.2
Missaukee county	8,828	5	1	11.3
Osceola county	17,774	14	3	16.9
Roscommon county	1,672	10	2	119.6

*† These footnotes are below Table 42, on a preceding page.

TABLE 44.—Concluded.

Geographical divisions.	Average.			
	Population.*	Cases.†	Deaths.	Death rates.
Bay and Eastern Division.	343,057	567	98	28.6
Arenac county	8,717	18	3	34.4
Bay county	63,138	157	27	42.8
Huron county	34,051	70	13	38.2
Lapeer county	27,921	35	5	17.9
Saginaw county	84,110	138	23	27.3
Sanilac county	34,623	40	8	23.1
St. Clair county	55,039	79	15	27.3
Tuscola county	35,458	30	4	11.3
Central Division.	315,338	279	50	15.9
Barry county	22,829	15	3	13.1
Clinton county	25,688	16	4	15.6
Eaton county	31,720	18	4	12.6
Genesee county	41,750	38	7	16.8
Gratiot county	29,777	13	3	10.1
Ingham county	41,883	55	9	21.5
Ionia county	34,874	18	4	11.5
Livingston county	19,485	17	3	15.4
Montcalm county	33,827	19	4	11.8
Shiawassee county	33,505	70	9	26.9
Southwestern Division.	140,712	97	22	15.6
Allegan county	39,107	23	6	15.3
Berrien county	47,950	44	9	18.8
Cass county	20,604	13	3	14.6
Van Buren county	33,051	17	4	12.1
Southern Central Division.	318,281	269	42	13.2
Branch county	26,234	15	4	15.2
Calhoun county	50,633	60	8	15.8
Hillsdale county	29,988	24	3	10.0
Jackson county	47,004	41	9	19.1
Kalamazoo county	46,223	61	6	13.0
Lenawee county	48,829	33	6	12.3
St. Joseph county	24,114	8	1	4.1
Washtenaw county	45,256	27	5	11.0
Southeastern Division.	454,319	1,024	215	47.3
Macomb county	32,792	49	11	33.5
Monroe county	33,100	52	10	30.2
Oakland county	44,325	34	7	15.8
Wayne county	344,102	889	187	54.3

*† These footnotes are below Table 42, on a preceding page.

THE PREVALENCE OF DIPHTHERIA IN URBAN AND RURAL LOCALITIES.

Table 45 indicates that, in 1908, with the exception of groups two and five, diphtheria was most prevalent in the large centers of population, and the least prevalent in rural localities.

By Table 45A, it may be seen that, in 1908, the urban localities which showed much higher death rates from diphtheria than the death rate for this disease for the entire State for that year were: Alpena, Big Rapids, Calumet township, Charlotte, Cheboygan, Detroit, Escanaba, Holland, Iron Mountain, Ironwood, Ishpeming, Lansing, Ludington, Negaunee, Norway, Owosso, Sault Ste. Marie, Wyandotte and Ypsilanti.

The localities, shown in Table 45A, in which the rates were much lower in 1908 than the rate for the entire State for that year were: Adrian, Flint, Jackson, Kalamazoo, Marquette, Pontiac and Saginaw.

The localities, shown in Table 45A, which showed much higher death rates from diphtheria in 1908 than the average for such localities in the years 1904-7, were: Alpena, Charlotte, Cheboygan, Escanaba, Holland, Iron Mountain, Ironwood, Ishpeming, Lansing, Ludington, Negaunee, Owosso, Sault Ste. Marie and Ypsilanti.

The localities, shown in Table 45A, which showed much lower death rates from diphtheria in 1908 than the average for such localities in the years 1904-7, were: Adrian, Bay City, Big Rapids, Calumet township, Detroit, Flint, Grand Rapids, Jackson, Kalamazoo, Marquette, Monroe, Muskegon, Pontiac and Saginaw.

There were no deaths from diphtheria in 1908 in Albion, Ann Arbor, Battle Creek, Benton Harbor, Cadillac, Coldwater, Grand Haven, Hancock, Hillsdale, Houghton, Ionia, Laurium, Manistee, Manistique, Mt. Clemens, Mt. Pleasant, Petoskey, Port Huron, St. Joseph and Traverse City.

TABLE 45.—*The prevalence of diphtheria in urban and rural localities, in Michigan, in 1908.*

Localities—grouped according to density of population.	Population.*	Health jurisdictions.			Cases.†	Deaths.	Death rates per 100,000 of the population.
		Total.	Infected.				
			Number.	Per cent of all jurisdictions.			
Cities over 50,000	512,905	3	3	100	899	81	15.8
Cities from 25,000 to 50,000	126,978	4	4	100	148	8	6.3
Cities from 10,000 to 25,000 and Calumet township (18,261)	233,222	16	16	100	248	51	21.9
Cities and villages from 5,000 to 10,000	188,759	28	18	64	321	46	24.4
Cities and villages under 5,000‡	354,646	329	59	18	249	28	7.9
Total urban	1,416,510	380	100	26	1,865	214	15.1
Balance of localities—principally townships§	1,222,540	1,278	231	18	793	113	9.2

* † These footnotes are below Table 42, on a preceding page.

‡ Exclusive of fifty-two cities and villages, for which the population* in 1908 cannot be correctly estimated.

§ Includes the fifty-two cities and villages mentioned in the preceding paragraph, but does not include Calumet township, which, for the purpose of this study, is included in the third group of urban localities, which have corresponding populations.

TABLE 45A.—*The prevalence of diphtheria in 1908, and preceding years, in each of the principal localities included in the first four groups in Table 45.*

Localities.	1908. Population.*	1908. Cases.	1908. Deaths.	1908. Deaths per 100,000 inhabitants.	Average, 1904-1907. Population.*	Average, 1904-1907. Cases.	Average, 1904-1907. Deaths.	Average, 1904-1907. Deaths per 100,000 inhabitants.
Adrian	11,706	15	1	8.5	11,065	12	2	18.1
Albion	5,367	0	0	....	5,102	2	0	....
Alpena	12,998	†	11	84.6	12,625	4	.8	6.3
Ann Arbor	14,689	9	0	....	14,631	9	.8	5.5
Battle Creek	25,863	36	0	....	23,582	60	5	21.2
Bay City	40,535	47	5	12.3	37,352	‡26	‡8	21.4
Benton Harbor	6,842	3	0	....	6,755	12	1	14.8
Big Rapids	5,018	4	1	19.9	4,915	14	2	40.7
Cadillac	7,789	0	0	....	7,229	14	2	27.7
Calumet township	18,261	26	4	21.9	17,702	18	5	28.2
Charlotte	5,360	5	1	18.7	4,964	1	0	....
Cheboygan	6,971	†	3	43.0	6,821	3	.3	4.4
Coldwater	6,234	0	0	....	6,229	1	.3	4.8
Detroit	358,159	733	66	18.4	333,504	§819	105	31.5
Escanaba	12,647	41	7	55.3	11,679	11	1	8.6
Flint	16,665	2	1	6.0	15,552	21	4	25.7
Grand Haven	5,735	0	0	....	5,425	2	0	....
Grand Rapids	103,871	101	11	10.6	98,776	331	33	33.4
Hancock	8,024	0	0	....	6,782	†	2	29.5
Hillsdale	5,467	0	0	....	5,056	.3	0	....
Holland	10,142	16	4	39.4	9,407	4	.8	8.5
Houghton	5,333	0	0	....	4,715	.8	.5	10.6
Ionia	5,235	3	0	....	5,227	2	.3	5.7
Iron Mountain	7,928	13	5	63.1	8,339	7	2	24.0
Ironwood	10,333	†	8	77.4	10,137	†	6	59.2
Ishpeming	9,991	183	16	160.1	11,011	21	3	27.2
Jackson	25,420	34	2	7.9	25,345	42	8	31.6
Kalamazoo	35,160	31	1	2.8	31,799	64	5	15.7
Lansing	24,067	56	6	24.9	21,698	13	2	9.2
Laurium	9,664	0	0	....	8,407	.5	.3	3.6
Ludington	7,352	11	4	54.4	7,294	17	3	41.1
Manistee	11,156	4	0	....	12,126	22	3	24.7
Manistique	5,066	3	0	....	4,773	18	2	41.9
Marquette	11,272	8	1	8.9	10,893	18	2	18.4
Menominee	9,374	4	1	10.7	10,451	4	1	9.6
Monroe	7,213	4	1	13.9	6,535	22	2	30.6
Mt. Clemens	7,640	0	0	....	7,308	24	4	54.7
Mt. Pleasant	5,306	4	0	....	4,793	31	2	41.7
Muskegon	20,976	13	3	14.3	20,927	38	4	19.1
Negaunee	6,659	29	5	75.1	6,746	6	.5	7.4
Norway	5,558	11	1	18.0	5,125	14	1	19.5
Owosso	9,594	†	2	20.8	9,314	6	0	....
Petoskey	5,087	2	0	....	5,149	5	.3	5.8
Pontiac	11,999	15	1	8.3	11,302	†	2	17.7
Port Huron	20,898	6	0	....	20,355	54	7	34.4
Saginaw	50,875	65	4	7.9	48,210	112	13	27.0
St. Joseph	5,489	0	0	....	5,385	3	.5	9.3
Sault Ste. Marie	12,346	9	4	32.4	11,781	9	2	17.0
Traverse City	13,067	8	0	....	11,924	15	.8	6.7
Wyandotte	5,667	9	2	35.3	5,516	†	2	36.3
Ypsilanti	7,796	28	4	51.3	7,666	4	1	13.0

* Estimated for intercensal years.

† Fatal cases only reported.

‡ Does not include West Bay City for 1904, which was consolidated with Bay City in 1905.

§ Average for three years only.

THE REPORTED SOURCES OF CONTAGIUM IN DIPHTHERIA.

Table 46 indicates that the two principal ways in which diphtheria is spread are:

1. By infection from outside health jurisdictions.
2. By infection from a recent previous case in the same household or locality.

The change in the method of studying diphtheria, by *households* instead of *outbreaks,* has resulted in a very decided change in the order and importance of the two first items in Table 46 as sources of contagium in diphtheria, as may be seen by reference to the corresponding table, and accompanying text, in the annual report of this Department for 1906.

The fact that over fifty-one per cent of the cases of diphtheria in the years, 1906-8, in which a source was given, were due to infection from outside jurisdictions, is a striking example of the lack of, or imperfection, in many instances, of the local efforts for the restriction of the disease.

Were all cases of diphtheria promptly and properly isolated, and the isolation continued until the danger of infecting others was at an end, the spread of the disease from one locality to another would be a rare occurrence.

The places from which and to which diphtheria was spread in 1908 are shown in Table 47.

In the past, very many cases of diphtheria have been reported as due to exposure to persons suffering from sore throat, and other throat troubles, which, in reality, were cases of diphtheria, of a more or less mild character.

Another, and what is generally believed to be a fruitful source of contagium in outbreaks of diphtheria, is the contact of well persons with those recently recovered from the disease, but in the throats of whom the bacilli are still present.

TABLE 46.—*The reported sources of contagium in diphtheria, in Michigan, in the three years, 1906-1908, as indicated by the number and per cent of instances in which each of the given sources was responsible for the introduction of the disease into a household.*

Sources.	Number of instances.	Per cent of all instances in which a source was given.
Outside jurisdiction	259	51.4
Traced to a former case in same locality	215	42.7
At school	10	2.0
Infected premises, clothing, etc	10	2.0
Insanitary conditions	7	1.4
Infected by animals	2	.4
Contaminated water	1	.2
Not stated or statements doubtful	6,234	*92.5

* Per cent of all households in which diphtheria occurred.

TABLE 47.—*Localities from which and to which diphtheria was spread, during the year 1908.*

Spread from:	To:	Spread from:	To:
Alger county, (No locality given.)	Eaton county, Chester township.	Kalamazoo county, Augusta village.	Barry county, Hope township.
Alpena county, Alpena city.	Presque Isle county, Belknap township.	Kalamazoo county, Augusta village,	Kalamazoo county, Charleston township.
Alpena county, Alpena city.	Presque Isle county, Millersburg village.	Kalamazoo county, Augusta village.	Kalamazoo county, Comstock township.
Bay county, Bay City.	Tuscola county, Akron township.	Kalamazoo county, Augusta village.	Kalamazoo county, Galesburg village.
Berrien county, Coloma village.	Berrien county, Watervliet village.	Kalamazoo county, Augusta village.	Kalamazoo county, Ross township.
Branch county, Union City village.	Calhoun county, Battle Creek city.	Kent county, Grand Rapids city.	Muskegon county, Muskegon city.
Calhoun county, Battle Creek city.	Calhoun county, Emmet township.	Leelanau county, Centerville township.	Leelanau county, Leland township.
Dickinson county, Felch township.	Dickinson county, Breen township.	Lenawee county, Adrian city.	Lenawee county, Adrian township.
Genesee county, Flint city.	Oakland county, Pontiac city.	Luce county, (No locality given.)	Chippewa county Dafter township.
Gratiot county, Alma city.	Gratiot county, Arcadia township.	Mackinac county, Garfield township.	Mackinac county, Newton township.
Houghton county, Hancock city.	Ontonagon county, Greenland township.	Mecosta county, (No locality given.)	Osceola county, Burdell township.
Houghton county, Lake Linden village.	Ontonagon county, Interior township.	Ogemaw county, Rose City city.	Lapeer county, Rich township.
Huron county, Colfax township.	Huron county, Verona township.	Ontonagon county, Interior township.	Houghton county, Duncan township.
Ingham county, Lansing city.	Kent county, Alpine township.	Saginaw county, Saginaw city.	Bay county, Pinconining township.
Ingham county Lansing city.	Shiawassee county, Woodhull township.	Saginaw county, Saginaw city.	Mason county, Ludington city.
Ionia county, Orleans township.	Ionia county, Easton township.	St. Clair county, Port Huron city.	Tuscola county, Novesta township.

TABLE 47.—CONCLUDED.

Spread from:	To:	Spread from:	To:
Sanilac county, Croswell city.	Sanilac county, Lexington village.	Wayne county, Detroit city.	Tuscola county, Millington township.
Shiawassee county, Antrim township.	Livingston county, Cohoctah township.	Wayne county, Detroit city.	Washtenaw county, Augusta township.
Washtenaw county, Saline village.	Washtenaw county, Lodi township.	FROM OUTSIDE THE STATE TO LOCALITIES IN MICHIGAN.	
Washtenaw county, Saline village.	Washtenaw county, Ypsilanti city.	Illinois, Peoria,	Kalamazoo county, Kalamazoo city.
Washtenaw county Superior township.	Washtenaw county, Ann Arbor city.	Indiana, South Bend.	Van Vuren county, Paw Paw township.
Washtenaw county, Ypsilanti city.	Washtenaw county, Saline village.	Massachusetts, Lynn.	Calhoun county, Emmet township.
Wayne county, Dearborn township.	Wayne county, Springwells township.	Minnesota, Duluth.	Ontonagon county, Interior township.
Wayne county, Detroit city.	Arenac county, Deep River township.	Minnesota, Hibbing.	Houghton county, Calumet township.
Wayne county, Detroit city.	Mecosta county, Wheatland township.	Missouri, Kansas City.	Arenac county, Deep River township.
Wayne county, Detroit city.	St. Clair county, Casco township.	Montana, (No locality given.)	Allegan county, Monterey township.
Wayne county, Detroit city.	St. Clair county, Clay township.	Ohio, Oak Harbor.	Lenawee county, Morenci village.

RESTRICTIVE AND PREVENTIVE MEASURES IN DIPHTHERIA.

By reference to Table 48, it may be seen that, of the total number of reports in which a definite statement was made relative to the restrictive and preventive measures of isolation and disinfection in households in which diphtheria occurred, in the three years 1906-1908, 88 per cent of the reports showed the above measures had been enforced. One gratifying result of these restrictive and preventive measures is shown in the table, viz., that in 80 per cent of the households the disease was restricted to the first case.

It is believed that a very much better showing could be made relative to the results of restrictive measures in diphtheria, as shown by Tables 48 to 51, if, in every case, the isolation of the patient was continued, even after apparent complete recovery, until it was determined by repeated bacteriological tests, that the throat of such person was free from diphtheria bacillus. This applies, with equal force, to those persons who have been thoroughly exposed to the disease.

In the pamphlet on the "Restriction and Prevention of Diphtheria," published by this Department, the statement is made that all persons recovering, or recently recovered, from diphtheria should be considered dangerous; therefore such a person should not be permitted to associate with others, or to attend school, church or any other public assembly until the throat and any sores which may have been on the lips or nose are healed, nor until two negative cultures have been made of the throat. As soon as the throat has cleaned up, make cultures two or three days apart, and as soon as they show negative twice the patient can be disinfected and allowed to go. The bacillus, which is the specific cause of diphtheria, has been found in the throat weeks after apparent complete recovery from the disease, and unless cultures of the throat have been made, the patient should remain in isolation for two weeks after apparent complete recovery.

The difficulty in having bacteriological tests made, in the past, except in the cases of three or four of the large cities, is now overcome, as the State Laboratory is in a position to take care of these tests, and no further trouble should be experienced in determining the proper time at which to raise the quarantine in cases of diphtheria.

TABLE 48.—*Restrictive and preventive measures in diphtheria, in Michigan, in the three years, 1906-1908.*

	Number of households.	Per cent.
PLACARDING, ISOLATION AND DISINFECTION:		
Enforced	5,926	88
Neglected	288	4
Not stated or statements doubtful	524	8
Instances in which the disease was restricted to the first case in a household	5,422	80

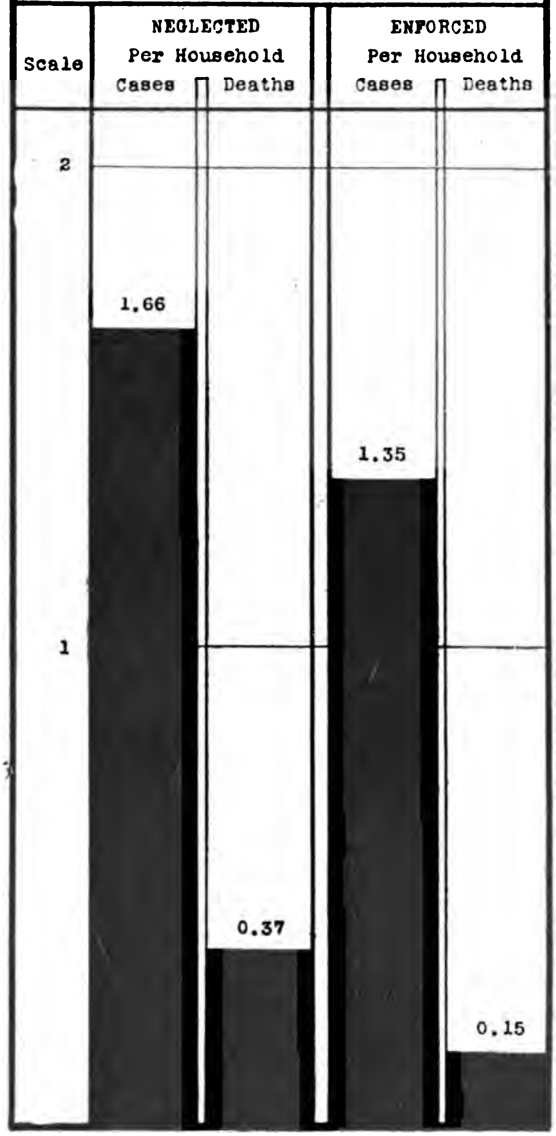
Table 49 and accompanying diagram are somewhat similar in forms to tables and diagrams in the annual reports of this Department ending with 1904, but the figures now relate to *households* instead of *outbreaks*. The showing made in the years, 1906-1908, in those instances in which the restrictive and preventive measures of placarding, isolation and disinfection, were enforced, is encouraging, particularly in the case of the average number of deaths per household.

TABLE 49.—*Showing the total number of households in which diphtheria was present during the three years, 1906-1908; and the total and average number of cases and deaths in each household in which the restrictive measures were enforced or neglected.*

	Total number of households, 6,738.		Restrictive measures enforced in 5,926 households.		Restrictive measures neglected in 288 households.	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Totals	9,241	1,168	7,999	877	478	108
Average number per household	1.37	.17	1.35	.15	1.66	.37

DIPHTHERIA RESTRICTED
BY ISOLATION AND DISINFECTION.

Average numbers of cases and deaths per household in households in which restrictive measures were Neglected and in households in which restrictive measures were Enforced during the three years, 1906-1908.



By Table 50, it may be seen that, in the years, 1906-1908, the fatality (deaths per 100 cases) from diphtheria in those households in which the antitoxin treatment was used was fifty-six per cent less than in those households where it was not used.

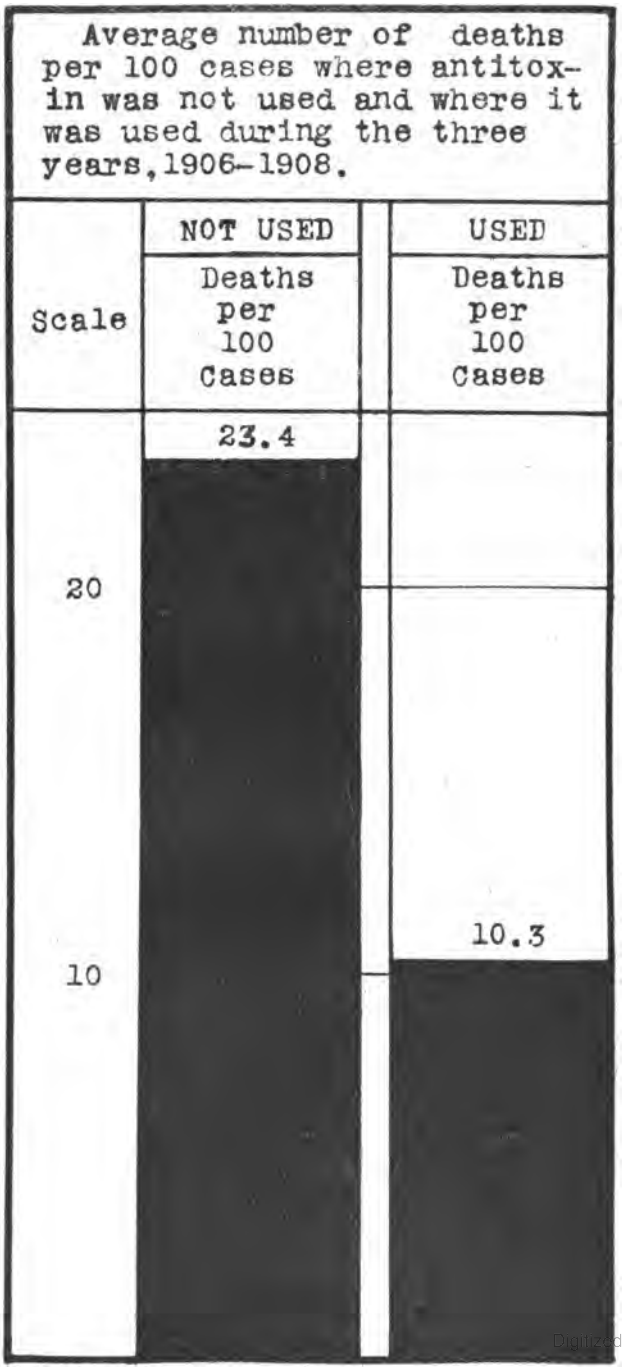
The decrease in the death rate from diphtheria since 1894, when the general use of antitoxin began, may be seen by reference to Table 42, on a preceding page. It will be noted that, in 1908, the deaths per 100,000 of the population were smaller than at any time since the disease has been studied by this Department.

TABLE 50.—*The antitoxin treatment of persons sick from diphtheria, in Michigan, in the three years, 1906-1908.*

	Number of households.	Number of cases.	Number of deaths.	Deaths per 100 cases
All outbreaks of diphtheria	6,738	9,241	1,168	12.6
Outbreaks in which antitoxin was administered to each sick person in a household*	3,545	4,924	509	10.3
Outbreaks in which antitoxin was not administered to the sick	376	529	124	23.4

* There were also 228 households in which 781 cases and 105 deaths occurred, but in which only a portion of the sick persons were treated with antitoxin, and as the reports did not show how many of the 105 fatal cases were included in the 427 cases treated, the 228 households, and the cases and deaths which occurred in them, could not be used in making comparison relative to the fatality from diphtheria in households in which antitoxin was and was not used.

FATALITY FROM DIPHTHERIA REDUCED BY THE USE OF ANTITOXIN



Average number of deaths per 100 cases where antitoxin was not used and where it was used during the three years, 1906-1908.

The immunizing property of antitoxin is strikingly shown by Table 51. It should be stated, however, that of those exposed persons who were treated with antitoxin and who subsequently developed diphtheria, many of them had the disease in a very mild form.

TABLE 51.—*The number and per cent of persons exposed to diphtheria, who were treated with antitoxin, and who were subsequently taken sick with the disease, in each of the years, 1902-1908.*

Years.	Exposed persons treated with antitoxin.		
	Number.	Taken sick.	Per cent.
1902	495	16	3.23
1903	585	12	2.05
1904	612	24	3.92
1905	1,312	50	3.81
1906	2,190	61	2.79
1907	1,896	83	4.38
1908	1,209	37	3.06
Average	1,186	40	3.41

WHOOPING-COUGH IN MICHIGAN IN 1908 AND PRECEDING YEARS.

GENERAL PREVALENCE.

During the year ending December 31, 1908, whooping-cough was reported present in 770 households, with a total of 1,248 cases, including 283 deaths. As the health officers of many localities did not report the cases of whooping-cough which occurred in their localities, it is impossible to determine, with any degree of accuracy, the total number of households infected or the number of cases that occurred in such households.

In 1908, compared with the preceding year, there was a large increase in the number of reported cases of whooping-cough, and the death rate per 100,000 inhabitants was slightly higher.

In 1908, compared with the average for the twenty-two years, 1886-1907, the number of reported cases of whooping-cough was 61 per cent less, while the death rate per 100,000 inhabitants was 71 per cent greater, as may be seen by reference to Table 52.

The fatality rate (deaths per 100 cases) for whooping-cough in 1908 was five times greater than the average for the twenty-two years preceding, as shown by Table 52.

In studying the fatality rates from whooping-cough, particularly in recent years, the fact should be borne in mind that, prior to 1898, not all deaths were reported; and that while the deaths from whooping-cough are now fully reported, a large number of cases are not reported, making the fatality in recent years much too high.

Table 53 gives the death rates for whooping-cough, as compiled by the Secretary of State, prior to the commencement of the compilation of this disease by the State Health Department. Comparing the death rates prior to 1886 with those since that time, it will be seen that, as a rule, those of the former were much greater, probably due to the different methods in use in the two departments in the classification of deaths from whooping-cough when complicated with or followed by other diseases induced by it.

TABLE 52.—*The general prevalence of whooping-cough, in Michigan, during the twenty-three years, 1886-1908.*

Years.	Population.*	Reported cases.†	Reported deaths.	Deaths per 100 cases.‡	Deaths per 100,000 of the population.
1886	1,933,735	2,642	62	2.3	3.2
1887	1,973,774	2,267	59	2.6	3.0
1888	2,013,812	2,502	49	2.0	2.4
1889	2,053,851	2,694	41	1.5	2.0
1890	2,093,889	983	20	2.0	1.0
1891	2,130,827	2,360	101	4.3	4.7
1892	2,167,765	3,188	77	2.4	3.6
1893	2,204,703	4,047	134	3.3	6.1
1894	2,241,641	4,555	123	2.7	5.5
1895	2,271,531	4,284	109	2.5	4.8
1896	2,301,421	5,466	91	1.7	4.0
1897	2,331,311	3,978	72	1.8	3.1
1898	2,361,201	5,300	267	5.0	11.3
1899	2,391,091	6,509	216	3.3	9.0
1900	2,420,982	3,397	177	5.2	7.3
1901	2,450,872	2,955	118	4.0	4.8
1902	2,475,499	3,534	222	6.3	8.9
1903	2,502,758	4,172	361	8.7	14.4
1904	2,530,016	1,779	141	7.9	5.6
1905	2,557,275	1,196	119	9.9	4.7
1906	2,584,533	1,364	392	28.7	15.2
1907	2,611,792	872	214	24.5	8.2
1908	2,639,050	1,248	283	22.7	10.8
Averages per year	2,314,927	3,100	149	4.8	6.5

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* Estimated for intercensal years.

† From many localities only the fatal cases were reported during many of the years.

‡ For the reason that, in many instances, only the fatal cases were reported, these fatality rates are inaccurate.

TABLE 53.—*The number of deaths from whooping-cough, in Michigan, per 100,000 persons living, in each of the seventeen years, 1869-1885. Compiled from the Secretary of State's Vital Statistics of Michigan.*

Years	1869.	1870.	1871.	1872.	1873.	1874.	1875.	1876.	1877.	1878.	1879	1880.	1881.	1882.	1883.	1884.	1885.	Average. 1869-1885.
Deaths	13.9	10.1	5.5	15.1	15.6	11.2	7.2	12.4	8.7	8.5	10.2	16.1	8.4	5.0	5.2	8.8	7.4	10.0

GEOGRAPHICAL DISTRIBUTION OF WHOOPING-COUGH.

Table 54 indicates that in the eleven years, 1898-1908, compared with the average death rate for the entire State for the same period (9.1 per 100,000), whooping-cough was much more prevalent than the average in the Upper Peninsular Division, and slightly more prevalent than the average in the Northern, Northeastern, Bay and Eastern and Southeastern Divisions.

The counties in which whooping-cough was unusually prevalent during the eleven years, 1898-1908, are: Alger, Roscommon, Dickinson, Houghton, Delta, Cheboygan, Marquette, Menominee, Alpena, Otsego, Bay, Kalkaska, Midland, Antrim, Gladwin, Macomb, Montcalm, Gogebic, Ogemaw, Baraga, Iron and Montmorency.

TABLE 54.—*The geographical distribution of whooping-cough, in Michigan, in the eleven years, 1898-1908, as indicated by the average number of cases and deaths, and the average deaths per 100,000 persons living, in each geographical division shown in the table.*

Geographical divisions.	Average.			
	Population.*	Cases.†	Deaths.	Death rates.
UPPER PENINSULAR DIVISION.	268,670	593.5	43.2	16.1
Alger county	6,283	8	2	31.8
Baraga county	5,190	1	.6	11.6
Chippewa county	21,564	92	2	9.3
Delta county	26,425	67	5	18.9
Dickinson county	18,319	18	4	21.8
Gogebic county	16,900	24	2	11.8
Houghton county	67,613	150	13	19.2
Iron county	8,769	13	1	11.4
Keweenaw county	4,184	2	.2	4.8
Luce county	3,581	3	.4	11.2
Mackinac county	7,942	.5	.4	5.0
Marquette county	40,041	124	7	17.5
Menominee county	26,216	32	4	15.3
Ontonagon county	7,020	7	.7	10.0
Schoolcraft county	8,623	52	.9	10.4
NORTHWESTERN DIVISION.	90,988	82	6.9	7.6
Benzie county	10,872	7	.9	8.3
Grand Traverse county	23,019	31	2	8.7
Leelanau county	10,888	4	1	9.2
Manistee county	27,366	31	2	7.3
Wexford county	18,843	9	1	5.3
NORTHERN DIVISION.	82,926	116	9.3	11.2
Antrim county	15,480	31	2	12.9
Charlevoix county	15,605	10	1	6.4
Cheboygan county	17,037	15	3	17.6
Crawford county	3,589	4	.3	8.4
Emmet county	16,966	28	1	5.9
Kalkaska county	7,348	12	1	13.6
Otsego county	6,901	16	1	14.5
NORTHEASTERN DIVISION.	59,817	75	6.49	10.8
Alcona county	5,637	1	.09	1.6
Alpena county	19,816	18	3	15.1
Iosco county	10,278	9	1	9.7
Montmorency county	3,514	13	.4	11.4
Ogemaw county	8,499	30	1	11.8
Oscoda county	1,853	2	0	....
Presque Isle county	10,220	2	1	9.8
WESTERN DIVISION.	277,963	250	17.9	6.4
Kent county	137,937	145	6	4.3
Lake county	5,038	5	0	....
Mason county	19,809	22	2	10.1
Muskegon county	36,814	19	4	10.9
Newaygo county	18,273	11	1	5.5
Oceana county	17,698	20	.9	5.1
Ottawa county	42,394	28	4	9.4
NORTHERN CENTRAL DIVISION.	107,023	187	9.3	8.7
Clare county	9,054	18	.8	8.8
Gladwin county	8,070	17	1	12.4
Isabella county	24,164	27	2	8.3
Mecosta county	20,520	28	1	4.8
Midland county	14,902	58	2	13.4
Missaukee county	10,054	13	1	9.9
Osceola county	18,618	21	1	5.4
Roscommon county	1,641	5	.5	30.5

*** † These footnotes are below Table 52, on a preceding page.**

TABLE 54.—Concluded.

Geographical divisions.	Average.			
	Population.*	Cases.†	Deaths.	Death rates.
Bay and Eastern Division.	347,863	323	32	9.2
Arenac county	9,853	8	1	10.1
Bay county	64,059	53	9	14.0
Huron county	35,215	62	3	8.5
Lapeer county	27,314	36	2	7.3
Saginaw county	84,889	39	6	7.1
Sanilac county	34,977	51	3	8.6
St. Clair county	55,487	41	5	9.0
Tuscola county	36,069	33	3	8.3
Central Division.	316,594	520	21.6	6.8
Barry county	22,312	75	1	4.5
Clinton county	25,349	30	2	7.9
Eaton county	31,161	135	2	6.4
Genesee county	42,583	24	3	7.0
Gratiot county	30,238	22	3	9.9
Ingham county	43,309	42	2	4.6
Ionia county	35,075	72	2	5.7
Livingston county	18,888	43	.6	3.2
Montcalm county	33,735	40	4	11.9
Shiawassee county	33,944	37	2	5.9
Southwestern Division.	143,280	168	12	8.4
Allegan county	39,038	36	3	7.7
Berrien county	49,597	59	5	10.1
Cass county	20,284	27	1	4.9
Van Buren county	34,361	46	3	8.7
Southern Central Division.	324,084	419	21.8	6.7
Branch county	26,243	36	2	7.6
Calhoun county	52,777	87	5	9.5
Hillsdale county	29,837	47	1	3.4
Jackson county	47,323	78	4	8.5
Kalamazoo county	48,930	66	4	8.2
Lenawee county	49,015	44	3	6.1
St. Joseph county	23,512	21	.8	3.4
Washtenaw county	46,447	40	2	4.3
Southeastern Division.	488,606	199	48	9.8
Macomb county	33,084	36	4	12.1
Monroe county	33,141	47	3	9.1
Oakland county	45,481	30	2	4.4
Wayne county	376,900	86	39	10.3

* † These footnotes are below Table 52, on a preceding page.

REPORTED SOURCES OF CONTAGIUM IN WHOOPING-COUGH.

Of the total number of reports of whooping-cough in the three years, 1906-1908, less than eleven per cent gave a definite source of contagium.

As shown in Table 55, in the three years, 1906-1908, fifty-six per cent of the outbreaks, in which a source was given, were traced to former cases in the same localities, and forty-four per cent were traced to outside jurisdictions.

The places from which and to which whooping-cough was spread in 1908 are shown in Table 56.

TABLE 55.—*The reported sources of contagium in whooping-cough, in Michigan, in the three years, 1906-1908, as indicated by the number and per cent of instances in which each of the given sources was responsible for the introduction of the disease into a household.*

Sources.	Number of instances.	Per cent of all instances in which a source was given
Outside jurisdictions	96	44.0
Traced to former cases in same locality	122	56.0
Not stated, or statements doubtful	1,850	*89.5

* Per cent of all households in which whooping-cough occurred.

TABLE 56.—*Whooping-cough in Michigan, Localities from which and to which the disease was spread, during the year 1908.*

Spread from:	To:	Spread from:	To:
Allegan county, Fennville village.	Allegan county, Saugatuck township.	Lenawee county, Adrian city.	Jackson county, Liberty township.
Delta county, Escanaba city.	Marquette county, Wells township.	Lenawee county, Adrian city.	Monroe county, Ida township.
Emmet county, Alanson village.	Emmet county, Littlefield township.	Oakland county, Clarkston village.	Oakland county, Springfield township.
Gladwin county, Gladwin city.	Charlevoix county, Boyne City city.	Otsego county, Gaylord village.	Allegan county, Saugatuck township.
Grand Traverse county, Traverse City city.	Antrim county, Echo township.	Ottawa county, Holland city.	Allegan county, Leighton township.
Isabella county, Nottawa township.	Isabella county, Sherman township.	Ottawa county, Spring Lake village.	Ottawa county, Jamestown township.
Kent county, Grand Rapids city.	Jackson county, Grass Lake village.	Wayne county, Plymouth village.	Washtenaw county, Saline village.

RESTRICTIVE AND PREVENTIVE MEASURES IN WHOOPING-COUGH.

Table 57 indicates that in but 19 per cent of the outbreaks in whooping-cough in the three years, 1906-1908, was there any attempt made to restrict the disease, and this condition will continue until the dangerous character of this disease is fully and universally recognized.

The following question was received by this Department from one of the local health officers, and if the suggestions embodied in the reply to the same could be enforced, no doubt hundreds of cases would be prevented each year, as the school is, as a rule, the medium through which the disease is spread:

Question.—Should children, suffering from whooping-cough, be allowed to attend school?

Answer.—No; not only should the children sick with the disease be prevented from attending school, but those, also, in whose homes the disease is present.

TABLE 57.—*Restrictive and preventive measures in whooping-cough, in Michigan, in the three years, 1906-1908.*

Restrictive and preventive measures.	Number of households.	Per cent.
PLACARDING, ISOLATION AND DISINFECTION:		
Enforced	404	19.5
Neglected	921	44.5
Not stated, or statements doubtful	743	36.0

SCARLET FEVER IN MICHIGAN IN 1908 AND PRECEDING YEARS.

GENERAL PREVALENCE.

During the year 1908, scarlet fever was reported present in 2,146 households in this State, with an aggregate of 3,087 cases, including 191 deaths.

In 1908, compared with the preceding year, there were 573 cases and 24 deaths more.

In 1908, compared with the average for twenty-four years, 1884-1907 (9.8 per 100,000 population), the number of cases was considerably less and the deaths and death rate per 100,000 of the population slightly less, while the fatality (deaths per 100 cases) was slightly more.

A comparison of the death rates in Tables 58 and 59 shows that, from 1870 to 1883, inclusive, the average death rate from scarlet fever was much higher than in any year since that time, the highest rates being in the years prior to the establishment of the State Board of Health.

TABLE 58.—*The prevalence of scarlet fever, in Michigan, during the twenty-five years, 1884-1908.*

Years.	Population.*	Reported cases.	Reported deaths.	Deaths per 100 cases.	Deaths per 100,000 of the population.
1884	1,853,658	2,476	230	9.3	12.4
1885	1,893,697	2,750	187	6.8	9.9
1886	1,933,735	3,046	275	9.0	14.2
1887	1,973,774	3,400	314	9.2	15.9
1888	2,013,812	2,989	200	6.7	9.9
1889	2,053,851	3,535	166	4.7	8.1
1890	2,093,889	3,835	162	4.2	7.7
1891	2,130,827	6,212	286	4.6	13.4
1892	2,167,765	7,075	487	6.9	22.5
1893	2,204,703	6,065	415	6.8	18.8
1894	2,241,641	5,500	203	3.7	9.1
1895	2,271,531	3,908	125	3.2	5.5
1896	2,301,421	2,646	81	3.1	3.5
1897	2,331,311	2,482	115	4.6	4.9
1898	2,361,201	2,409	100	4.2	4.2
1899	2,391,091	4,345	171	3.9	7.2
1900	2,420,982	6,734	306	4.5	12.6
1901	2,450,872	7,726	298	3.9	12.2
1902	2,475,499	6,582	248	3.8	10.0
1903	2,502,758	5,353	212	4.0	8.5
1904	2,530,016	4,088	228	5.6	9.0
1905	2,557,275	2,286	125	5.5	4.9
1906	2,584,533	3,066	225	7.3	8.7
1907	2,611,792	2,514	167	6.6	6.4
1908	2,639,050	3,087	191	6.2	7.2
Averages per year	2,276,027	4,164	221	5.3	9.7

* Estimated for intercensal years.

TABLE 59.—*The number of deaths from scarlet fever, in Michigan, per 100,000 persons living in each of the fifteen years, 1869-1883. Compiled from the Secretary of State's Vital Statistics of Michigan.*

Years	1869.	1870.	1871.	1872.	1873.	1874.	1875.	1876.	1877.	1878.	1879.
Deaths	22.1	72.0	56.6	44.3	43.9	32.2	30.0	27.4	26.9	27.7	26.3

Years	1880.	1881.	1882.	1883.	Average. 1869-1883.
Deaths	22.7	22.8	34.3	37.9	35.1

GEOGRAPHICAL DISTRIBUTION OF SCARLET FEVER.

Table 60 indicates that, compared with the average for the entire State for the seventeen years, 1892-1908 (9.0 deaths per 100,000 inhabitants), scarlet fever was much more prevalent than the average in the Upper Peninsular, Northeastern and Southeastern Divisions.

The counties in which scarlet fever was unusually prevalent in the seventeen years, 1892-1908, as compared with the average for the entire State for that period, placed in the order of greatest death rates, are:

Houghton	with a death rate of	30.2	per 100,000
Oscoda	“ “ “ “ “	27.0	“ “
Mackinac	“ “ “ “ “	25.8	“ “
Gogebic	“ “ “ “ “	24.8	“ “
Missaukee	“ “ “ “ “	22.1	“ “
Keweenaw	“ “ “ “ “	21.8	“ “
Lake	“ “ “ “ “	18.6	“ “
Wexford	“ “ “ “ “	17.4	“ “
Wayne	“ “ “ “ “	16.6	“ “
Otsego	“ “ “ “ “	16.1	“ “
Alpena	“ “ “ “ “	15.6	“ “
Chippewa	“ “ “ “ “	15.4	“ “
Macomb	“ “ “ “ “	15.2	“ “
Marquette	“ “ “ “ “	15.1	“ “
Ontonagon	“ “ “ “ “	14.9	“ “
Antrim	“ “ “ “ “	13.8	“ “
Montmorency	“ “ “ “ “	12.6	“ “
Cheboygan	“ “ “ “ “	12.5	“ “
Schoolcraft	“ “ “ “ “	12.2	“ “
Crawford	“ “ “ “ “	12.1	“ “
Dickinson	“ “ “ “ “	11.6	“ “
Gladwin	“ “ “ “ “	11.4	“ “

TABLE 60.—*The geographical distribution of scarlet fever, in Michigan, in the seventeen years, 1892-1908, as indicated by the average number of cases and deaths, and the average deaths per 100,000 persons living, in each geographical division shown in the table.*

Geographical divisions.	Average.			
	Population.*	Cases.†	Deaths.	Death rates.
UPPER PENINSULAR DIVISION.	248,728	577	42.7	17.2
Alger county	5,099	6	.2	3.9
Baraga county	4,884	3	0	....
Chippewa county	19,489	35	3	15.4
Delta county	24,055	38	2	8.8
Dickinson county	17,240	33	2	11.6
Gogebic county	16,133	39	4	24.8
Houghton county	59,620	181	18	30.2
Iron county	7,713	12	.5	6.5
Keweenaw county	3,670	5	.8	21.8
Luce county	3,173	1	.2	6.3
Mackinac county	7,743	14	2	25.8
Marquette county	39,653	154	6	15.1
Menominee county	25,371	27	2	7.9
Ontonagon county	6,713	15	1	14.9
Schoolcraft county	8,172	14	1	12.2
NORTHWESTERN DIVISION.	85,903	174	8.3	9.7
Benzie county	9,943	31	1	10.1
Grand Traverse county	21,196	51	2	9.4
Leelanau county	10,431	8	.3	2.9
Manistee county	27,089	46	2	7.4
Wexford county	17,244	38	3	17.4
NORTHERN DIVISION.	75,637	154	7.8	10.3
Antrim county	14,493	28	2	13.8
Charlevoix county	14,063	30	.9	6.4
Cheboygan county	16,022	30	2	12.5
Crawford county	3,296	9	.4	12.1
Emmet county	14,792	27	.8	5.4
Kalkaska county	6,779	19	.7	10.3
Otsego county	6,192	11	1	16.1
NORTHEASTERN DIVISION.	57,121	95	6.3	11.0
Alcona county	5,587	9	.4	7.2
Alpena county	19,186	27	3	15.6
Iosco county	11,061	19	1	9.0
Montmorency county	3,166	11	.4	12.6
Ogemaw county	7,533	20	.6	8.0
Oscoda county	1,852	4	.5	27.0
Presque Isle county	8,736	5	.4	4.6
WESTERN DIVISION.	272,104	538	17.4	6.4
Kent county	132,898	314	9	6.8
Lake county	5,371	19	1	18.6
Mason county	19,424	22	2	10.3
Muskegon county	37,113	81	2	5.4
Newaygo county	18,622	20	.8	4.3
Oceana county	17,370	22	.6	3.5
Ottawa county	41,306	60	2	4.8
NORTHERN CENTRAL DIVISION.	102,716	160.3	6.96	6.8
Clare county	8,719	8	.7	8.0
Gladwin county	6,997	10	.8	11.4
Isabella county	23,320	38	.7	3.0
Mecosta county	20,676	32	1	4.8
Midland county	14,390	23	.7	4.9
Missaukee county	9,030	20	2	22.1
Osceola county	17,936	29	1	5.6
Roscommon county	1,648	.3	.06	3.6

*† These footnotes are below Table 58, on a preceding page.

TABLE 60.—CONCLUDED.

Geographical divisions.	Average.			
	Population.*	Cases.†	Deaths.	Death rates.
BAY AND EASTERN DIVISION.	344,015	556	25.6	7.4
Arenac county	8,876	12	.6	6.8
Bay county	63,408	118	6	9.5
Huron county	34,325	42	3	8.7
Lapeer county	27,850	55	1	3.6
Saginaw county	84,081	104	5	5.9
Sanilac county	34,706	36	2	5.8
St. Clair county	55,177	128	5	9.1
Tuscola county	35,592	61	3	8.4
CENTRAL DIVISION.	315,278	571	15.3	4.9
Barry county	22,194	25	.8	3.6
Clinton county	25,649	52	2	7.8
Eaton county	31,693	55	1	3.2
Genesee county	41,885	103	2	4.8
Gratiot county	29,803	39	1	3.4
Ingham county	42,108	71	2	4.7
Ionia county	35,002	78	2	5.7
Livingston county	19,412	32	.5	2.6
Montcalm county	33,900	58	2	5.9
Shiawassee county	33,632	58	2	5.9
SOUTHWESTERN DIVISION.	141,213	224	7.8	5.5
Allegan county	39,108	59	2	5.1
Berrien county	48,315	73	3	6.2
Cass county	20,590	30	.8	3.9
Van Buren county	33,200	62	2	6.0
SOUTHERN CENTRAL DIVISION.	319,227	577	13.8	4.3
Branch county	26,208	36	1	3.8
Calhoun county	51,022	67	1	2.0
Hillsdale county	29,960	48	1	3.3
Jackson county	47,102	92	2	4.2
Kalamazoo county	46,603	118	3	6.4
Lenawee county	48,850	98	2	4.1
St. Joseph county	24,049	44	.8	3.3
Washtenaw county	45,433	74	3	6.6
SOUTHEASTERN DIVISION.	459,194	836	66	14.4
Macomb county	32,848	68	5	15.2
Monroe county	33,152	43	1	3.0
Oakland county	44,508	62	2	4.5
Wayne county	348,686	663	58	16.6

*† These footnotes are below Table 58, on a preceding page.

PREVALENCE OF SCARLET FEVER IN URBAN AND RURAL LOCALITIES.

With the exception of the fourth group, shown in Table 61, the death rates from scarlet fever were greater in the urban than in the rural localities.

By Table 61A, it may be seen that, in 1908, the urban localities which showed much higher death rates from scarlet fever than the death rate for this disease for the entire State (7.2 per 100,000 population) for that year were: Adrian, Bay City, Cadillac, Calumet township, Detroit, Hancock, Ironwood, Ishpeming, Ludington, Marquette, Muskegon and St. Joseph.

The localities, shown in Table 61A, in which the death rates from scarlet fever were much lower in 1908 than the rate for the entire State for that year were: Kalamazoo, Lansing and Saginaw.

The localities, shown in Table 61A, which showed much higher death rates from scarlet fever in 1908 than the average for such localities in the years 1904-7, were: Adrian, Bay City, Cadillac, Hancock, Ironwood, Ishpeming, Jackson, Lansing, Ludington, Marquette, Muskegon and St. Joseph.

The localities, shown in Table 61A, which showed much lower death rates in 1908 than the average for such localities in the years 1904-7, were: Calumet township and Kalamazoo.

There were no deaths from scarlet fever in 1908, as shown by Table 61A, in Albion, Alpena, Ann Arbor, Battle Creek, Benton Harbor, Big Rapids, Charlotte, Cheboygan, Coldwater, Flint, Grand Haven, Hillsdale, Holland, Houghton, Ionia, Iron Mountain, Laurium, Manistee, Manistique, Menominee, Monroe, Mt. Clemens, Mt. Pleasant, Negaunee, Norway, Owosso, Petoskey, Pontiac, Port Huron, Sault Ste. Marie, Traverse City, Wyandotte and Ypsilanti.

TABLE 61.—*The prevalence of scarlet fever in urban and rural localities, in Michigan, in 1908.*

Localities—grouped according to density of population.	Population.*	Health jurisdictions.			Cases.†	Deaths.	Death rates per 100,000 of the population.
		Total.	Infected.				
			Number.	Per cent of all jurisdictions.			
Cities over 50,000	512,905	3	3	100	1,104	83	16.2
Cities from 25,000 to 50,000	126,978	4	4	100	260	18	14.2
Cities from 10,000 to 25,000 and Calumet township (18,261)	233,222	16	12	75	305	14	6.0
Cities and villages from 5,000 to 10,000	188,759	28	18	64	167	8	4.2
Cities and villages under 5,000‡	354,646	329	81	25	378	16	4.5
Total urban	1,416,510	380	118	31	2,214	139	9.8
Balance of localities—principally townships§	1,222,540	1,278	230	18	873	52	4.3

* † These footnotes are below Table 58, on a preceding page.

‡ Exclusive of fifty-two cities and villages, for which the population in 1908 cannot be correctly estimated.

§ Includes the fifty-two cities and villages mentioned in the preceding paragraph, but does not include Calumet township, which, for the purpose of this study, is included in the third group of urban localities, which have corresponding populations.

TABLE 61A.—*The prevalence of scarlet fever in 1908, and preceding years, in each of the principal localities included in the first four groups in Table 61.*

Localities.	1908.				Average, 1904-1907.			
	Population.*	Cases.	Deaths.	Deaths per 100,000 inhabitants.	Population.*	Cases.	Deaths.	Deaths per 100,000 inhabitants.
Adrian	11,706	5	2	17.1	11,065	2	.3	2.7
Albion	5,367	24	0	....	5,102	1	0	....
Alpena	12,998	0	0	....	12,625	.8	.3	2.4
Ann Arbor	14,689	23	0	....	14,631	17	0	....
Battle Creek	25,863	17	0	....	23,582	21	.3	1.3
Bay City	40,535	167	15	37.0	37,352	‡17	2	5.4
Benton Harbor	6,842	13	0	....	6,755	5	0	....
Big Rapids	5,018	0	0	....	4,915	3	.3	6.1
Cadillac	7,789	15	3	38.5	7,229	6	1	13.8
Calumet township	18,261	52	2	11.0	17,702	51	7	39.5
Charlotte	5,360	2	0	....	4,964	6	0	....
Cheboygan	6,971	0	0	....	6,821	8	0	....
Coldwater	6,234	1	0	....	6,229	.8	.3	4.8
Detroit	358,159	531	74	20.7	333,504	484	62	18.6
Escanaba	12,647	10	1	7.9	11,679	4	.8	6.8
Flint	16,665	0	0	....	15,552	39	1	6.4
Grand Haven	5,735	9	0	....	5,425	10	0	....
Grand Rapids	103,871	521	8	7.7	98,776	201	7	7.1
Hancock	8,024	†	1	12.5	6,782	†	.3	4.4
Hillsdale	5,467	3	0	....	5,056	9	.5	9.9
Holland	10,142	7	0	....	9,407	17	.8	8.5
Houghton	5,333	0	0	....	4,715	.3	0	....
Ionia	5,235	7	0	....	5,227	3	0	....
Iron Mountain	7,928	11	0	....	8,339	22	1	12.0
Ironwood	10,333	†	4	38.7	10,137	§1	.5	4.9
Ishpeming	9,991	61	2	20.0	11,011	23	1	9.1
Jackson	25,420	44	2	7.9	25,345	37	.8	3.2
Kalamazoo	35,160	32	1	2.8	31,799	48	2	6.3
Lansing	24,067	20	1	4.2	21,698	13	0	....
Laurium	9,664	0	0	....	8,407	†	6	71.4
Ludington	7,352	6	1	13.6	7,294	3	0	....
Manistee	11,156	0	0	....	12,126	8	.8	6.6
Manistique	5,066	0	0	....	4,773	.3	0	....
Marquette	11,272	17	1	8.9	10,893	18	.3	2.8
Menominee	9,374	1	0	....	10,451	.8	0	....
Monroe	7,213	0	0	....	6,535	4	.3	4.6
Mt. Clemens	7,640	0	0	....	7,308	5	.3	4.1
Mt. Pleasant	5,306	0	0	....	4,793	10	.3	6.3
Muskegon	20,976	128	3	14.3	20,927	94	1	4.8
Negaunee	6,659	4	0	....	6,746	10	.8	11.9
Norway	5,558	2	0	....	5,125	3	.3	5.9
Owosso	9,594	0	0	....	9,314	3	0	....
Petoskey	5,087	2	0	....	5,149	4	0	....
Pontiac	11,999	0	0	....	11,302	†	.3	2.7
Port Huron	20,898	3	0	....	20,355	49	2	9.8
Saginaw	50,875	52	1	2.0	48,210	26	1	2.1
St. Joseph	5,489	†	1	18.2	5,385	.3	0	....
Sault Ste. Marie	12,346	19	0	....	11,781	9	.8	6.8
Traverse City	13,067	17	0	....	11,924	19	.5	4.2
Wyandotte	5,667	0	0	....	5,516	7	2	36.3
Ypsilanti	7,796	4	0	....	7,666	6	0	....

* Estimated for intercensal years.

† Fatal cases only reported.

‡ Does not include West Bay City for 1904, which was consolidated with Bay City in 1905.

§ Average for three years only.

THE REPORTED SOURCES OF CONTAGIUM IN SCARLET FEVER.

By reference to Table 62 it may be seen that, in the years 1906-8, in only eight per cent of the outbreaks of scarlet fever was the source of contagium traced by the health officers.

Of the outbreaks in which the source of contagium was definitely traced, 54 per cent were said to be due to infection to former cases in the same locality, and 44 per cent to infections from outside jurisdictions.

The places from which and to which scarlet fever was spread in 1908 are shown in Table 63.

TABLE 62.—*The reported sources of contagium in scarlet fever, in Michigan, in the three years, 1906-1908, as indicated by the number and per cent of instances in which each of the given sources was responsible for the introduction of the disease into a household.*

Sources.	Number of instances.	Per cent of instances in which a source was given.
Traced to former cases in same locality	260	53.9
Outside jurisdictions	213	44.2
Infected premises, clothing, etc	9	1.9
Not stated, or statements doubtful	5,390	*91.8

* Per cent of all households in which scarlet fever occurred.

TABLE 63.—*Scarlet fever in Michigan. Localities from which and to which the disease was spread, during the year 1908.*

Spread from:	To:	Spread from:	To:
Allegan county, Clyde township.	Allegan county, Ganges township.	Kent county, Grand Rapids city.	Allegan county, Wayland township.
Bay county, Bay City city.	Bay county, Frankenlust township.	Kent county, Grand Rapids city.	Kent county, Alpine township.
Branch county, Union township.	Branch county, Union City village.	Kent county, Grand Rapids city.	Kent county, Wyoming township.
Calhoun county, Leroy township.	Calhoun county, Athens township.	Kent county, Grand Rapids city.	Mecosta county, Wheatland township.
Cheboygan county Burt township.	Charlevoix county, Norwood township.	Kent county, Lowell village.	Kent county, Vergennes township.
Cheboygan county, Mackinaw City village.	Tuscola county, Millington township.	Kent county, Walker township.	Kent county, Gaines township.
Clare county, Harrison city.	Isabella county, Shepherd village.	Lenawee county, Adrian city.	Lenawee county, Adrian township.
Clinton county, Maple Rapids village.	Gratiot county, Fulton township.	Lenawee county, Madison township.	Lenawee county, Dover township.
Genesee county, Flint city.	Tuscola county, Novesta township.	Midland county, Midland city.	Midland county, Porter township.
Gratiot county, Alma city.	Gratiot county, Arcada township.	Montcalm county, Carson City village.	Midland county, Jasper township.
Gratiot county, Arcada township.	Gratiot county, Emerson township.	Montcalm county, Lakeview village.	Montcalm county, Douglass township.
Grand Traverse county, Traverse City city.	Leelanau county, Empire township.	Muskegon couuty, Muskegon city.	Oceana county, Hart village.
Hillsdale county, North Adams village.	Hillsdale county, Hillsdale city.	Oceana county, Hart village.	Oceana county, Weare township.
Ionia county, Easton township.	Ionia county, Ionia city.	Otsego county, Gaylord village.	Otsego county, Livingston township.
Iosco county, (No locality given.)	Sanilac county, Austin township.	Ottawa county, Georgetown township.	Ottawa county, Zeeland township.
Kalamazoo county, Augusta village.	Kalamazoo county, Charleston township.	Sanilac county, Marlette township.	Tuscola county, Koylton township.

TABLE 63.—CONCLUDED.

Spread from:	To:	Spread from:	To:
Schoolcraft county, Seney township.	Alger county, Burt township.	Illinois, Chicago.	Berrien county, Benton township.
Van Buren county, (No locality given.)	Berrien county, Watervliet township.	Indiana, Gary.	Bay county, Williams township.
Washtenaw county, Ann Arbor city.	Washtenaw county, Dexter village.	Indiana, (No locality given.)	Branch county, Union City village.
Wayne county, Detroit city.	Calhoun county, Burlington township.	Iowa, (No locality given.)	Berrien county, Niles city.
Wayne county, Detroit city.	Tuscola county, Millington township.	Minnesota. Minneapolis.	Delta county, Gladstone city.
Wexford county, Cedar Creek township.	Wexford county, Greenwood township.	Ohio, Toledo.	Monroe county, Bedford township.
Wexford county, Clam Lake township.	Wexford county, Cadillac city.	Ontario, (No locality given.)	Lapeer county, Imlay City village.
FROM OUTSIDE THE STATE TO LOCALITIES IN MICHIGAN.		Texas, (No locality given.)	Manistee county, Morilla township.
Canada, (No locality given.)	Missaukee county, Reeder township.	Wisconsin, (No locality given.)	Wexford county, Clam Lake township.

RESTRICTIVE AND PREVENTIVE MEASURES IN SCARLET FEVER.

By reference to Table 64 it will be seen that, in the years 1906-8, the restrictive and preventive measures (placarding, isolation and disinfection), in scarlet fever, were stated to have been enforced in eighty per cent and neglected in seven per cent of the households in which the disease occurred. There is a strong probability that in 12.4 per cent of the households in which no statement was made relative to the restrictive and preventive measures, that they were not enforced.

By a comparison of Table 64 with the corresponding table on page 137 of the annual report of this Department for 1906, it will be seen that, under the old plan of reporting and compiling by *outbreaks*, the percentage of instances in which the restrictive measures were enforced was but one-third of that under the new method of compiling by *households*. This is taken as a striking example of one of the imperfections of the old plan of reporting and not as an indication that a radical improvement has taken place in the matter of restricting the disease.

In view of the fact that this Department has conducted an active campaign against scarlet fever for 25 years, the results, at least in recent years, should be marked by a decreased prevalence of the disease in each year. That this is not so, is believed to be due to the fact that very many new health officers have to be educated each year in the method of restricting the disease, and the further fact, that, in the majority of instances, the health officers are not only underpaid, but are often denied the support and appreciation that their labors demand, and in some instances they are even subjected to abuse. Under these conditions it is not strange that the prevalence of this disease does not gradually decrease.

The following questions, and answers to same, relative to restrictive measures in scarlet fever, which may be of interest to health officers, were received by this Department during the past year:

Question.—Should butter, made by a family while under quarantine for scarlet fever, and to be placed on the market for public consumption, be confiscated?

Answer.—No; while the butter cannot be confiscated, nor the family prevented from using it themselves, the sale of butter for public consumption, made under those conditions, can be prohibited.

Question.—How long should a person exposed to scarlet fever be isolated?

Answer.—For at least two weeks from the time of exposure, when, if they show no symptoms of the disease, they should be given an antiseptic bath and their clothes thoroughly disinfected before being released.

Question.—What should be done to persons who, when placed under quarantine for scarlet fever, refuse to be isolated, and come and go as they choose?

Answer.—When such conditions exist, prosecutions should be resorted to.

TABLE 64.—*Restrictive and preventive measures in scarlet fever, in Michigan, in the three years, 1906-1908.*

Restrictive and preventive measures.	Number of households.	Per cent.
PLACARDING, ISOLATION AND DISINFECTION:		
Enforced	4,716	80.3
Neglected	429	7.3
Not stated, or statements doubtful	727	12.4

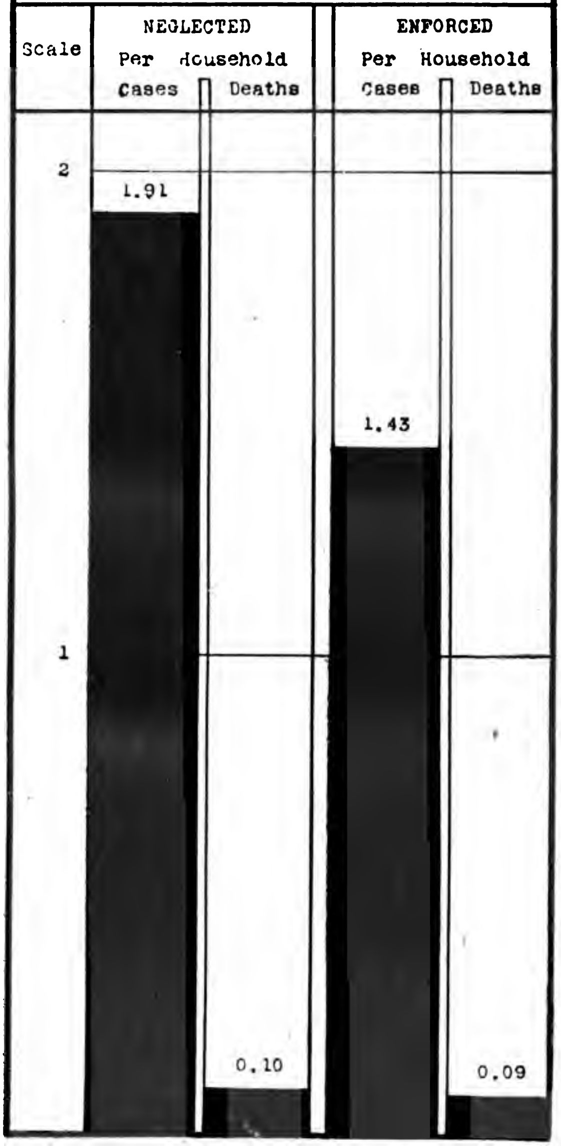
Table 65 and accompanying diagram are somewhat similar to tables and diagrams, showing the results of efforts for the restriction of scarlet fever, in the annual reports of this Department up to and including the year 1904. It is believed that a continuation of Table 65 for a number of years will show much better results than were shown by the tables in past years, when scarlet fever was studied by outbreaks.

TABLE 65.—*Showing the total number of households in which scarlet fever was present during the three years, 1906-1908; and the total and average number of cases and deaths in each household in which the restrictive measures were enforced or neglected.*

	Total number of households, 5,872.		Restrictive measures enforced in 4,716 households.		Restrictive measures neglected in 429 households.	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Totals	8,667	583	6,757	442	821	46
Average number per household	1.48	.10	1.43	.09	1.91	.10

SCARLET FEVER RESTRICTED
BY ISOLATION AND DISINFECTION.

Average numbers of cases and deaths per household in households in which restrictive measures were Neglected and in households in which restrictive measures were Enforced during the three years, 1906-1908.



SPECIAL INVESTIGATIONS, BY THE SECRETARY OF THIS BOARD, IN 1908, OF OUTBREAKS OF SCARLET FEVER.

Upon the invitation of the local authorities, in 1908, the Secretary of this Board made visits to the undermentioned localities, on the dates named, for the purpose of making investigation relative to outbreaks of scarlet fever:

Campbell Township, Ionia County, March 9.—The outbreak began in the Hotel at Clarksville, the wife and sister of the proprietor being affected. The patients were isolated and the entire upper part of the hotel was quarantined. No other cases occurred in the hotel.

White Cloud, March 17.—This investigation was made while the Secretary was on his way to Fremont to make investigation relative to an outbreak of smallpox in that place. Advice was given relative to the proper measures for the restriction of the disease.

MEASLES IN MICHIGAN IN 1908 AND PRECEDING YEARS.

GENERAL PREVALENCE.

During the year 1908, measles was reported present, in this State, in 3,275 households, with a total of 4,775 cases, including 121 deaths.

As only the fatal cases of measles were reported from many localities it was impossible to determine the number of infected households or the cases occurring therein.

By reference to Table 66 it may be seen that in 1908, compared with the preceding year, there were 7,364 cases and 131 deaths less.

In 1908, compared with the average for the eighteen years, 1890-1907, there were 6,511 cases and 20 deaths less, and the deaths per 100,000 inhabitants was 1.4 less.

A comparison of the death rates in Tables 66 and 67 indicates that, with the exception of the year 1900, as a rule, measles was much more prevalent in the years prior to the inauguration by this Department, in 1890, of active measures for its restriction, than in the years since that time.

TABLE 66.—*The prevalence of measles, in Michigan, during the nineteen years, 1890-1908.*

Years.	Population.*	Reported cases.	Reported deaths.	Deaths per 100 cases.	Deaths per 100,000 of the population.
1890	2,093,889	11,911	140	1.2	6.7
1891	2,130,827	12,173	149	1.2	7.0
1892	2,167,765	3,830	76	2.0	3.5
1893	2,204,703	7,334	119	1.6	5.4
1894	2,241,641	10,518	55	.5	2.5
1895	2,271,531	3,870	12	.3	.5
1896	2,301,421	15,409	156	1.0	6.8
1897	2,331,311	32,543	159	.5	6.8
1898	2,361,201	11,614	124	1.1	5.3
1899	2,391,091	12,005	166	1.4	6.9
1900	2,420,982	20,403	282	1.4	11.6
1901	2,450,872	4,629	62	1.3	2.5
1902	2,475,499	11,978	162	1.4	6.5
1903	2,502,758	8,941	140	1.6	5.6
1904	2,530,016	10,386	176	1.7	7.0
1905	2,557,275	6,061	111	1.8	4.3
1906	2,584,533	7,403	188	2.5	7.3
1907	2,611,792	12,139	252	2.1	9.6
1908	2,639,050	4,775	121	2.5	4.6
Average per year	2,382,529	10,943	140	1.3	5.9

* Estimated for intercensal years.

TABLE 67.—*The number of deaths from measles, in Michigan, per 100,000 persons living, in each of the twenty-one years, 1869-1889. Compiled from the Secretary of State's Vital Statistics of Michigan.*

Years	1869.	1870.	1871.	1872.	1873.	1874.	1875.	1876.	1877.	1878.	1879.
Deaths	12.9	4.7	5.5	14.1	18.6	3.4	9.5	8.1	4.1	1.0	10.5
Years	1880.	1881.	1882.	1883.	1884.	1885.	1886.	1887.	1888.	1889.	Av. 1869-1889.
Deaths	7.6	15.2	8.7	14.5	7.9	2.0	6.8	14.6	20.6	5.1	9.3

GEOGRAPHICAL DISTRIBUTION OF MEASLES.

Table 68 shows that, as indicated by the average death rate for the entire State for the sixteen years, 1893-1908 (5.9 per 100,000 inhabitants), measles was much more prevalent than usual in the Upper Peninsular and Northern Divisions. It was least prevalent in the Central Division.

The counties in which measles was unusually prevalent in the sixteen years, 1893-1908, placed in the order of greatest death rates, are:

Bay	with a death rate of	18.9	per 100,000
Alger	“ “ “ “ “	18.8	“ “
Keweenaw	“ “ “ “ “	18.7	“ “
Baraga	“ “ “ “ “	16.1	“ “
Alcona	“ “ “ “ “	14.4	“ “
Antrim	“ “ “ “ “	13.6	“ “
Marquette	“ “ “ “ “	12.6	“ “
Luce	“ “ “ “ “	12.5	“ “
Roscommon	“ “ “ “ “	12.4	“ “
Montmorency	“ “ “ “ “	12.3	“ “
Delta	“ “ “ “ “	12.2	“ “
Dickinson	“ “ “ “ “	11.6	“ “
Oceana	“ “ “ “ “	11.5	“ “
Oscoda	“ “ “ “ “	10.9	“ “
Missaukee	“ “ “ “ “	10.8	“ “
Kalkaska	“ “ “ “ “	10.2	“ “
Benzie	“ “ “ “ “	9.8	“ “
Mecosta	“ “ “ “ “	9.7	“ “
Berrien	“ “ “ “ “	8.2	“ “
Houghton	“ “ “ “ “	8.2	“ “
Otsego	“ “ “ “ “	8.0	“ “
Branch	“ “ “ “ “	7.6	“ “
Manistee	“ “ “ “ “	7.4	“ “

TABLE 68.—*The geographical distribution of measles, in Michigan, in the sixteen years, 1893-1908, as indicated by the average number of cases and deaths, and the average deaths per 100,000 persons living, in each geographical division shown in the table.*

Geographical divisions.	Average.			
	Population.*	Cases.†	Deaths.	Death rates.
UPPER PENINSULAR DIVISION.	251,797	1,322	22.16	8.8
Alger county	5,333	30	1	18.8
Baraga county	4,984	7	.8	16.1
Chippewa county	19,871	51	1	5.0
Delta county	24,494	69	3	12.2
Dickinson county	17,263	50	2	11.6
Gogebic county	16,154	89	1	6.2
Houghton county	60,973	379	5	8.2
Iron county	7,894	39	.4	5.1
Keweenaw county	3,735	22	.7	18.7
Luce county	3,188	15	.4	12.5
Mackinac county	7,675	43	.06	.8
Marquette county	39,586	367	5	12.6
Menominee county	25,506	28	1	3.9
Ontonagon county	6,883	44	.4	5.8
Schoolcraft county	8,258	89	.4	4.8
NORTHWESTERN DIVISION.	87,088	465	5.6	6.4
Benzie county	10,215	97	1	9.8
Grand Traverse county	21,624	105	1	4.6
Leelanau county	10,566	42	.6	5.7
Manistee county	27,122	161	2	7.4
Wexford county	17,561	60	1	5.7
NORTHERN DIVISION.	76,742	417	6.0	7.8
Antrim county	14,683	101	2	13.6
Charlevoix county	14,279	81	.6	4.2
Cheboygan county	16,206	29	1	6.2
Crawford county	3,295	25	.2	6.1
Emmet county	15,143	115	1	6.6
Kalkaska county	6,852	48	.7	10.2
Otsego county	6,284	18	.5	8.0
NORTHEASTERN DIVISION.	57,254	214	3.4	5.9
Alcona county	5,569	47	.8	14.4
Alpena county	19,327	45	.8	4.1
Iosco county	10,697	26	.3	2.8
Montmorency county	3,252	27	.4	12.3
Ogemaw county	7,609	37	.5	6.6
Oscoda county	1,831	1	.2	10.9
Presque Isle county	8,969	31	.4	4.5
WESTERN DIVISION.	273,065	1,948	14.1	5.2
Kent county	133,875	1,294	6	4.5
Lake county	5,259	31	.2	3.8
Mason county	19,535	66	1	5.1
Muskegon county	36,763	149	2	5.4
Newaygo county	18,558	76	.9	4.8
Oceana county	17,425	126	2	11.5
Ottawa county	41,650	206	2	4.8
NORTHERN CENTRAL DIVISION.	103,591	553	6.8	6.6
Clare county	8,750	59	.5	5.7
Gladwin county	7,133	17	.3	4.2
Isabella county	23,520	150	1	4.3
Mecosta county	20,666	135	2	9.7
Midland county	14,576	62	.8	5.5
Missaukee county	9,235	37	1	10.8
Osceola county	18,095	85	1	5.5
Roscommon county	1,616	8	.2	12.4

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* † These footnotes are below Table 66, on a preceding page.

TABLE 68.—CONCLUDED.

Geographical divisions.	Average.			
	Population.*	Cases.†	Deaths.	Death rates.
BAY AND EASTERN DIVISION.	344,639	1,107	23.1	6.7
Arenac county	9,042	17	.1	1.1
Bay county	63,580	245	12	18.9
Huron county	34,580	57	1	2.9
Lapeer county	27,777	132	1	3.6
Saginaw county	83,905	271	3	3.6
Sanilac county	34,760	129	2	5.8
St. Clair county	55,295	179	2	3.6
Tuscola county	35,700	77	2	5.6
CENTRAL DIVISION.	316,401	1,606	12.6	4.0
Barry county	22,739	161	.8	3.5
Clinton county	25,615	131	.9	3.5
Eaton county	31,657	249	1	3.2
Genesee county	42,036	167	1	2.4
Gratiot county	29,789	158	2	6.7
Ingham county	42,336	160	2	4.7
Ionia county	35,153	156	1	2.8
Livingston county	19,339	108	.9	4.7
Montcalm county	33,986	103	2	5.9
Shiawassee county	33,751	213	1	3.0
SOUTHWESTERN DIVISION.	141,752	825	8	5.6
Allegan county	39,103	229	2	5.1
Berrien county	48,699	278	4	8.2
Cass county	20,580	115	1	4.9
Van Buren county	33,370	203	1	3.0
SOUTHERN CENTRAL DIVISION.	320,299	2,114	15	4.7
Branch county	26,186	227	2	7.6
Calhoun county	51,429	392	2	3.9
Hillsdale county	29,942	183	2	6.7
Jackson county	47,194	249	2	4.2
Kalamazoo county	46,999	399	3	6.4
Lenawee county	48,874	311	1	2.0
St. Joseph county	24,045	159	1	4.2
Washtenaw county	45,630	194	2	4.4
SOUTHEASTERN DIVISION.	464,122	619	30	6.5
Macomb county	32,911	72	1	3.0
Monroe county	33,219	104	2	6.0
Oakland county	44,716	214	2	4.5
Wayne county	353,276	229	25	7.1

* † These footnotes are below Table 66, on a preceding page.

REPORTED SOURCES OF CONTAGIUM IN MEASLES.

Of the outbreaks in 14,328 households in which measles occurred in the three years 1906-8, the source of infection was traced in but 1,593 instances, or eleven per cent of the whole number of outbreaks, particulars relative to which may be found in Table 69.

The localities from which and to which measles was spread in 1908 are shown in Table 70.

TABLE 69.—*The reported sources of contagium in measles, in Michigan, in the three years, 1906-1908, as indicated by the number and per cent of instances in which each of the given sources was responsible for the introduction of the disease into a household.*

Sources.	Number of instances.	Per cent of all instances in which a source was given.
Outside jurisdictions	879	55.2
Traced to former cases in same locality	712	44.7
Infected clothing, mail, etc	2	.1
Not stated, or statements doubtful	12,735	*88.9

* Per cent of all households in which measles occurred.

TABLE 70.—*Measles in Michigan. Localities from which and to which the disease was spread, during the year 1908.*

Spread from:	To:	Spread from:	To:
Allegan county, Martin township.	Allegan county, Otsego village.	Branch county, Quincy village.	Branch county, Coldwater city.
Allegan county, Plainwell village.	Allegan county, Martin township.	Cass county, Calvin township.	Cass county, Mason township.
Allegan county, Saugatuck village.	Kalamazoo county, Pavilion township.	Charlevoix county, Boyne City city.	Mecosta county, Wheatland township.
Antrim county, Helena township.	Antrim county, Elk Rapids township.	Charlevoix county, St. James township.	Charlevoix county, Charlevoix city.
Benzie county, Frankfort village.	Benzie county, Benzonia village.	Delta county, Garden village.	Schoolcraft county, Inwood township.
Benzie county, South Frankfort village.	Benzie county, Gilmore township.	Eaton county, Charlotte city.	Eaton county, Chester township.
Benzie county, Weldon township.	Benzie county, Homestead township.	Eaton county, Grand Ledge city.	Eaton county, Windsor township.
Berrien county, Buchanan village.	Berrien county, Benton Harbor city.	Eaton county, (No locality given.)	Emmet county, Harbor Springs village.
Berrien county, Watervliet village.	Van Buren county, Hartford township.	Emmet county, Harbor Springs village.	Emmet county, Alanson village.
Berrien county, Weesaw township.	Berrien county, Chickaming township.	Emmet county, Petoskey city.	Emmet county, Littlefield township.
Branch county, Bronson township.	Branch county, Bronson village.	Grand Traverse county, Traverse City city.	Grand Traverse county, Peninsula township.
Branch county, Bronson township.	Branch county, Noble township.	Gratiot county, Bethany township.	Gratiot county, Emerson township.
Branch county, Bronson village.	Branch county, Kinderhook township.	Isabella county, Mt. Pleasant city.	Isabella county, Union township.
Branch county, Coldwater city.	Branch county, Batavia township.	Isabella county, Mt. Pleasant city.	Midland county, Porter township.
Branch county, Girard township.	Branch county, Coldwater city.	Isabella county, (No locality given.)	Schoolcraft county, Manistique city.
Branch county, (No locality given.)	Calhoun county, Athens township.	Isabella county, Shepherd village.	Isabella county, Coe township.

TABLE 70.—CONTINUED.

Spread from:	To:	Spread from:	To:
Jackson county, Waterloo township.	Jackson county, Henrietta township.	Kent county, Grand Rapids city.	Ottawa county, Holland township.
Kalamazoo county, Kalamazoo city.	Allegan county, Martin township.	Kent county, Grand Rapids city.	Saginaw county, Oakley village.
Kalkaska county. Kalkaska village.	Barry county, Maple Grove township.	Kent county, Grand Rapids city.	Van Buren county, Columbia township.
Kent county, Cannon township.	Kent county, Gratton township.	Kent county. Grand Rapids city.	Van Buren county, Keeler township.
Kent county, Grand Rapids city.	Allegan county, Martin township.	Kent county, Lowell village.	Kent county, Gaines township.
Kent county, Grand Rapids city.	Allegan county, Plainwell village.	Mecosta county, Mecosta village.	Ontonagon county, Ontonagon village.
Kent county, Grand Rapids city.	Charlevoix county, Charlevoix city.	Menominee county, Menominee city.	Menominee county, Ingallston township.
Kent county, Grand Rapids city.	Emmet county, Petoskey city.	Oakland county, Pontiac city.	Oakland county, West Bloomfield township.
Kent county, Grand Rapids city.	Gratiot county, Emerson township.	Oceana county, Claybanks township.	Muskegon county, Montague township.
Kent county, Grand Rapids city.	Kent county, Cedar Springs village.	Oceana county, Hart township.	Oceana county, Shelby township.
Kent county, Grand Rapids city.	Kent county, Gaines township.	Oceana county, Hart village.	Oceana county, Elbridge township.
Kent county, Grand Rapids city.	Kent county, Walker township.	Osceola county, Rose Lake township.	Osceola county, Highland township.
Kent county, Grand Rapids city.	Muskegon county, Muskegon city.	St. Joseph county, Colon township.	St. Joseph county Burr Oak village.
Kent county, Grand Rapids city.	Muskegon county, Norton township.	St. Joseph county, Colon village.	St. Joseph county, Burr Oak township.
Kent county, Grand Rapids city.	Oceana county, Shelby village.	St. Joseph county, Fawn River township.	Branch county, Noble township.
Kent county, Grand Rapids city.	Ottawa county, Holland city.	St. Joseph county, Sherman township.	St. Joseph county. Burr Oak village.

TABLE 70.—CONCLUDED.

Spread from:	To:
St. Joseph county, Sturgis city.	St. Joseph county, Sturgis township.
Wayne county, Detroit city.	Lenawee county, Blissfield village.
Wayne county, Detroit city.	Livingston county, Hamburg township.
Wayne county, Detroit city.	Macomb county, Richmond village.
Wayne county, Detroit city.	Oakland county, Pontiac city.
Wayne county, Detroit city.	St. Clair county, Burtchville township.
Wayne county, Detroit city.	St. Clair county, Grant township.
Wayne county, Detroit city.	Wayne county, Northville village.

FROM OUTSIDE THE STATE TO LOCALITIES IN MICHIGAN.

Spread from:	To:
Colorado, (No locality given.)	Benzie county, Blaine township.
Dakota, (No locality given.)	Calhoun county, Battle Creek city.
Illinois, Chicago.	Allegan county, Lee township.
Illinios, Chicago.	Ottawa county, Holland city.
Illinois, Chicago.	St. Joseph county, Sturgis township.
Illinois, Chicago.	Van Buren county, Breedsville village.
Illinois, Chicago.	Van Buren county, South Haven city.
Illinois, (No locality given.)	Oscoda county. Clinton township.
Illinois, (No locality given.)	Van Buren county, Keeler township.
Illinois, Peoria.	Eaton county, Olivet village.
New York, (No locality given.)	Macomb county, New Baltimore village.
Ohio, (No locality given.)	Hillsdale county, Wright township.
Oaklahoma, (No locality given.)	Eaton county, Vermontville village.
West Virginia, Learmont.	Benzie county, Benzonia village.
Wisconsin, (No locality given.)	Van Buren county, Paw Paw village.

RESTRICTIVE AND PREVENTIVE MEASURES IN MEASLES.

Table 71 indicates that in but 37 per cent of the households in which measles occurred, in the years 1906-8, were the restrictive and preventive measures all enforced. The enforcement of these measures in 1908, as compared with the average for the two years, 1906-7, was greatly neglected, as in only 28 per cent of the households were these measures carried out, being 30 per cent less than the average for the two years 1906-7. While this fact is discouraging, to a certain extent, to this Department, still it is a much better showing than when this disease was studied by *outbreaks,* as may be seen by reference to Table 71, on page 148 of the annual report of this Department for 1906, and is an indication of the more scientific method of studying the disease by *households.* The fact that, in 1906-8, fifty-five per cent of the outbreaks of measles were traced to infection from outside jurisdictions, is a very good indication that the disease is not being restricted to any considerable extent.

In the past, the question has frequently arisen as to the necessity for placarding in outbreaks of measles, and many health officers have experienced considerable difficulty in the performance of their duty in this respect. The duty of the health officer is clearly outlined in Section 4450 of the Compiled Laws of 1897, which provides that when any disease dangerous to the public health exists in a locality, the board of health shall use all possible care to prevent the spread of infection, and give public notice of infected places, by placard on the premises and otherwise if necessary.

The apathy of the people in respect to the restriction and prevention of measles has done much to discourage those who would put forth their best energies in the work of restricting this often underestimated but really dangerous disease.

Parents are ignorant of or indifferent to the danger to be apprehended from the exposure of their children to measles, and, in many instances, do not secure the services of a physician for their children when suffering from this disease. Many parents are also ignorant of their duty, under the law, in respect to the reporting of cases of measles to the local health officials, and, as a consequence, the health officials are not in a position to institute restrictive measures or to make complete reports to this Department relative to the prevalence of measles in their locality. To the parents, then, we must look primarily for any considerable reduction in the sickness and mortality from measles, and for more complete reports of the disease. This means educational work on the part of those who have charge of the health service of the State, both local and general, and the State Health Department stands ready at all times to assist the local health officials in this educational work, by means of advice, and by the furnishing of documents on the restriction and prevention of measles for distribution among the families and neighbors of those sick with the disease. A leaflet issued by the local board of health, setting forth the dangerous character of measles and the duty of householders in outbreaks of the disease, and widely distributed at a time when measles was present in any locality, would, it is believed, prove to be one of the best methods for securing the coöperation of the people in the restriction of the disease. And the educational work should be continued from time to time as measles may appear in the locality until the people are thoroughly awakened to the necessity for its restriction. A suggested form of leaflet for this purpose was printed on page 193 of the annual report of this Board for 1908.

TABLE 71.—*Restrictive and preventive measures, in measles, in Michigan, in the three years, 1906-1908.*

Restrictive and preventive measures.	Number of instances.	Per cent.
PLACARDING, ISOLATION AND DISINFECTION:		
Enforced	5,369	37
Neglected	4,804	34
Not stated, or statements doubtful	4,155	29

SMALLPOX IN MICHIGAN IN 1908 AND PRECEDING YEARS.

GENERAL PREVALENCE.

During the year 1908, smallpox was reported present in 1,103 households, in this State, with an aggregate of 2,306 cases, including 8 deaths.

By Table 72 it may be seen that, in 1908, compared with the number of cases and deaths from smallpox in the preceding year, there were 594 more cases, with the same number of deaths.

A comparison of smallpox in 1908 with the years prior to 1901, may be made by reference to Table 72, in which it will be seen that, from 1882 to 1901, there was, comparatively, but little smallpox in the State. The fatality (deaths per 100 cases), however, was very much greater in the years in which deaths occurred prior to 1901.

Table 73 shows that the average number of deaths from smallpox, per 100,000 of the population, for the thirteen years prior to the institution, by this Department, of active measures for the restriction of this disease, was very much greater than the average for the twenty-seven years since that time. Excluding the year 1882, in which the results of the educational work could scarcely be expected to show any marked results, the death rate for the twenty-six years, ending in 1908, was about seven-tenths of one per cent per 100,000 inhabitants.

TABLE 72.—*The prevalence of smallpox, in Michigan, during the twenty-seven years, 1882-1908.*

Years.	Population.*	Reported cases.	Reported deaths.	Deaths per 100 cases.	Deaths per 100,000 of the population.
1882	1,745,298	589	159	27.0	9.1
1883	1,799,478	29	2	6.9	.1
1884	1,853,658	22	3	13.6	.2
1885	1,893,697	27	6	22.2	.3
1886	1,933,735	24	7	29.2	.4
1887	1,973,774	4	0	....	....
1888	2,013,812	42	6	14.3	.3
1889	2,053,851	57	4	7.0	.2
1890	2,093,889	2	0	....	....
1891	2,130,827	3	0	....	....
1892	2,167,765	1	1	100.0	.05
1893	2,204,703	10	3	30.0	.1
1894	2,241,641	285	60	21.1	2.7
1895	2,271,531	187	47	25.1	2.1
1896	2,301,421	38	16	42.1	.7
1897	2,331,311	15	0	....	....
1898	2,361,201	32	1	3.1	.04
1899	2,391,091	139	6	4.3	.3
1900	2,420,982	694	9	1.3	.4
1901	2,450,872	5,088	31	.6	1.3
1902	2,475,499	7,086	40	.6	1.6
1903	2,502,758	6,341	33	.5	1.3
1904	2,530,016	5,753	24	.4	.9
1905	2,557,275	2,985	74	2.5	2.9
1906	2,584,533	1,240	3	.2	.1
1907	2,611,792	1,712	8	.5	.3
1908	2,639,050	2,306	8	.3	.3
Averages per year	2,242,054	1,286	20	1.6	.9

* Estimated for intercensal years.

TABLE 73.—*The number of deaths from smallpox, in Michigan, per 100,000 persons living in each of the thirteen years, 1869-1881. Compiled from the Secretary of State's Vital Statistics of Michigan.*

Years	1869.	1870.	1871.	1872.	1873.	1874.	1875.	1876.	1877.	1878.	1879.	1880.	1881.	Average 1869-81.
Deaths	3.7	0.8	6.0	23.7	7.0	1.3	1.8	5.2	6.8	0.4	0.4	0.2	4.9	4.8

GEOGRAPHICAL DISTRIBUTION OF SMALLPOX.

Table 74 indicates that, according to the average case rate for smallpox for the entire State (121 cases per 100,000 of the population), during the eleven years, 1898-1908, this disease was more prevalent than usual in the Northern, Northeastern, Northern Central and Bay and Eastern Divisions.

As indicated by the case rates, the counties in which smallpox was much more than usually prevalent during the eleven years, 1898-1908, placed in the order of greatest case rates, are:

Cheboygan	with a case rate of	410.9	per 100,000
Gladwin	" " " " "	396.5	" "
Otsego	" " " " "	391.2	" "
Isabella	" " " " "	384.9	" "
Kalkaska	" " " " "	353.8	" "
Missaukee	" " " " "	348.1	" "
Bay	" " " " "	341.9	" "
Osceola	" " " " "	333.0	" "
Ogemaw	" " " " "	305.9	" "
Alcona	" " " " "	301.6	" "
Clare	" " " " "	298.2	" "
Montmorency	" " " " "	284.6	" "
Iosco	" " " " "	282.2	" "
Gratiot	" " " " "	271.2	" "
Arenac	" " " " "	263.9	" "
Mackinac	" " " " "	251.8	" "
Roscommon	" " " " "	243.8	" "
Oceana	" " " " "	243.0	" "
Lake	" " " " "	238.2	" "
Mecosta	" " " " "	229.0	" "
Alpena	" " " " "	227.1	" "
Antrim	" " " " "	226.1	" "
Presque Isle	" " " " "	215.8	" "
Emmet	" " " " "	212.2	" "
Mason	" " " " "	191.8	" "
Saginaw	" " " " "	188.5	" "
Midland	" " " " "	187.9	" "
Huron	" " " " "	187.4	" "
Sanilac	" " " " "	180.1	" "
Charlevoix	" " " " "	179.4	" "
Clinton	" " " " "	173.6	" "
Crawford	" " " " "	167.2	" "
Chippewa	" " " " "	166.9	" "
Oscoda	" " " " "	161.9	" "
Wexford	" " " " "	159.2	" "
Montcalm	" " " " "	157.1	" "
Menominee	" " " " "	156.4	" "

TABLE 74.—*The geographical distribution of smallpox, in Michigan, in the eleven years, 1898-1908, as indicated by the average number of cases and deaths, and the average cases per 100,000 persons living, in each geographical division shown in the table.*

Geographical divisions.	Average.			
	Population.*	Cases.†	Deaths.	Case rates.
UPPER PENINSULAR DIVISION.	268,670	238	2.3	88.6
Alger county	6,283	6	0	95.5
Baraga county	5,190	6	0	115.6
Chippewa county	21,564	36	.4	166.9
Delta county	26,425	35	.6	132.5
Dickinson county	18,319	8	0	43.7
Gogebic county	16,900	9	.1	53.3
Houghton county	67,613	36	.4	53.2
Iron county	8,769	6	0	68.4
Keweenaw county	4,184	2	0	47.8
Luce county	3,581	4	0	111.7
Mackinac county	7,942	20	.2	251.8
Marquette county	40,041	17	.4	42.5
Menominee county	26,216	41	.2	156.4
Ontonagon county	7,020	1	0	14.2
Schoolcraft county	8,623	11	0	127.6
NORTHWESTERN DIVISION.	90,988	108	.3	118.7
Benzie county	10,872	14	0	128.8
Grand Traverse county	23,019	30	.2	130.3
Leelanau county	10,888	4	0	36.7
Manistee county	27,366	30	0	109.6
Wexford county	18,843	30	.1	159.2
NORTHERN DIVISION.	82,926	228	.9	274.9
Antrim county	15,480	35	.2	226.1
Charlevoix county	15,605	28	0	179.4
Cheboygan county	17,037	70	.2	410.9
Crawford county	3,589	6	0	167.2
Emmet county	16,966	36	.4	212.2
Kalkaska county	7,348	26	.1	353.8
Otsego county	6,901	27	0	391.2
NORTHEASTERN DIVISION.	59,817	152	.8	254.1
Alcona county	5,637	17	0	301.6
Alpena county	19,816	45	.3	227.1
Iosco county	10,278	29	.1	282.2
Montmorency county	3,514	10	0	284.6
Ogemaw county	8,499	26	.1	305.9
Oscoda county	1,853	3	0	161.9
Presque Isle county	10,220	22	.3	215.3
WESTERN DIVISION.	277,963	316	5.1	113.7
Kent county	137,937	129	4	93.5
Lake county	5,038	12	0	238.2
Mason county	19,809	38	.3	191.8
Muskegon county	36,814	31	.2	84.2
Newaygo county	18,273	22	.1	120.4
Oceana county	17,698	43	.1	243.0
Ottawa county	42,894	41	.4	96.7
NORTHERN CENTRAL DIVISION.	107,023	328	1.1	306.5
Clare county	9,054	27	.1	298.2
Gladwin county	8,070	32	0	396.5
Isabella county	24,164	93	.2	384.9
Mecosta county	20,520	47	.2	229.0
Midland county	14,902	28	0	187.9
Missaukee county	10,054	35	.1	348.1
Osceola county	18,618	62	.5	333.0
Roscommon county	1,641	4	0	243.8

*** † These footnotes are below Table 72, on a preceding page.**

TABLE 74.—CONCLUDED.

Geographical divisions.	Average.			
	Population.*	Cases.†	Deaths.	Case rates.
BAY AND EASTERN DIVISION.	347,863	657	2.6	188.9
Arenac county	9,853	26	.2	263.9
Bay county	64,059	219	.5	341.9
Huron county	35,215	66	.4	187.4
Lapeer county	27,314	29	.1	106.2
Saginaw county	84,889	160	.6	188.5
Sanilac county	34,977	63	.3	180.1
St. Clair county	55,487	46	.4	82.9
Tuscola county	36,069	48	.1	133.1
CENTRAL DIVISION.	316,594	434	1.9	137.1
Barry county	22,312	25	0	112.0
Clinton county	25,349	44	.2	173.6
Eaton county	31,161	43	.2	138.0
Genesee county	42,583	60	.3	140.9
Gratiot county	30,238	82	.3	271.2
Ingham county	43,309	23	0	53.1
Ionia county	35,075	51	.2	145.4
Livingston county	18,888	3	0	15.9
Montcalm county	33,735	53	.3	157.1
Shiawassee county	33,944	50	.4	147.3
SOUTHWESTERN DIVISION.	143,280	100	.7	69.8
Allegan county	39,038	23	.1	58.9
Berrien county	49,597	30	.3	60.5
Cass county	20,284	13	0	64.1
Van Buren county	34,361	34	.3	98.9
SOUTHERN CENTRAL DIVISION.	324,084	192	3.3	59.2
Branch county	26,243	11	.2	41.9
Calhoun county	52,777	67	.2	126.9
Hillsdale county	29,837	20	.3	67.0
Jackson county	47,323	28	2	59.2
Kalamazoo county	48,930	20	.3	40.9
Lenawee county	49,015	9	.1	18.4
St. Joseph county	23,512	17	.2	72.3
Washtenaw county	46,447	20	0	43.1
SOUTHEASTERN DIVISION.	488,606	283	3.8	57.9
Macomb county	33,084	28	.4	84.6
Monroe county	33,141	26	.1	78.5
Oakland county	45,481	37	.3	81.4
Wayne county	376,900	192	3	50.9

*** † These footnotes are below Table 72, on a preceding page.**

THE PREVALENCE OF SMALLPOX IN URBAN AND RURAL LOCALITIES.

By Table 75 it may be seen that, in 1908, a much greater proportion of urban than rural localities was infected with smallpox. It may also be seen that the case rate (number of cases per 100,000 inhabitants) was higher in the rural than in the urban localities, indicating that the disease was more prevalent in the rural localities.

By Table 75A, it may be seen that, in 1908, the urban localities which showed much higher case rates from smallpox than the case rate for this disease for the entire State for that year (87.4 cases per 100,000 population) were: Albion, Battle Creek, Cadillac, Ionia, Ludington, Manistee, Muskegon, Port Huron, Saginaw and Sault Ste. Marie.

The localities, shown in Table 75A, in which the case rates from smallpox were much lower in 1908 than the rate for the entire State for that year were: Adrian, Bay City, Big Rapids, Calumet township, Charlotte, Coldwater, Detroit, Escanaba, Flint, Grand Rapids, Holland, Jackson, Kalamazoo, Menominee, Mt. Pleasant, Negaunee, Petoskey, Pontiac and St. Joseph.

The localities, shown in Table 75A, which showed much higher case rates in 1908 than the average for such localities in the years 1904-7 were: Adrian, Albion, Battle Creek, Cadillac, Ionia, Ludington, Manistee, Muskegon, Negaunee, Port Huron, Saginaw, St. Joseph and Sault Ste. Marie.

The localities, shown in Table 75A, which showed much lower case rates from smallpox in 1908 than the average for such localities in the years 1904-7 were: Bay City, Big Rapids, Charlotte, Coldwater, Detroit, Escanaba, Flint, Grand Rapids, Holland, Jackson, Mt. Pleasant, Petoskey, Pontiac and Traverse City.

There were no cases of smallpox in 1908 in Alpena, Ann Arbor, Benton Harbor, Cheboygan, Grand Haven, Hancock, Hillsdale, Houghton, Iron Mountain, Ironwood, Ishpeming, Laurium, Manistique, Marquette, Monroe, Mt. Clemens, Norway, Owosso, Wyandotte and Ypsilanti.

TABLE 75.—*The prevalence of smallpox in urban and rural localities, in Michigan, in 1908.*

Localities—grouped according to density of population.	Population.*	Health jurisdictions.			Cases.†	Deaths.	Case rates per 100,000 of the population.
		Total.	Infected.				
			Number.	Per cent of all jurisdictions.			
Cities over 50,000	512,905	3	3	100	233	0	45.4
Cities from 25,000 to 50,000	126,978	4	4	100	129	0	101.6
Cities from 10,000 to 25,000 and Calumet township (18,261)	233,222	16	12	75	268	1	114.9
Cities and villages from 5,000 to 10,000	188,759	28	12	43	88	1	46.6
Cities and villages under 5,000‡	354,646	329	54	16	308	4	86.8
Total urban	1,416,510	380	85	22	1,026	6	72.4
Balance of localities—principally townships§	1,222,540	1,278	198	15	1,280	2	104.7

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* † These footnotes are below Table 72, on a preceding page.

‡ Exclusive of fifty-two cities and villages, for which the population in 1908 cannot be correctly estimated.

§ Includes the fifty-two cities and villages mentioned in the preceding paragraph, but does not include Calumet township, which, for the purpose of this study, is included in the third group of urban localities, which have corresponding populations.

TABLE 75A.—*The prevalence of smallpox in 1908, and preceding years, in each of the principal localities included in the first four groups in Table 75.*

Localities.	1908.				Average, 1904-1907.			
	Population.*	Cases.	Deaths.	Cases per 100,000 inhabitants.	Population.*	Cases.	Deaths.	Cases per 100,000 inhabitants.
Adrian	11,706	5	0	42.7	11,065	1	0	9.0
Albion	5,367	31	0	577.6	5,102	4	0	78.4
Alpena	12,998	0	0	....	12,625	5	.5	39.6
Ann Arbor	14,689	0	0	....	14,631	10	0	68.3
Battle Creek	25,863	75	0	290.0	23,582	33	.3	139.9
Bay City	40,535	25	0	61.7	37,352	†136	.5	364.1
Benton Harbor	6,842	0	0	....	6,755	.3	0	4.4
Big Rapids	5,018	1	0	19.9	4,915	8	.3	162.8
Cadillac	7,789	10	0	128.4	7,229	5	0	69.2
Calumet township	18,261	2	0	11.0	17,702	2	0	11.3
Charlotte	5,360	1	0	18.7	4,964	4	0	80.6
Cheboygan	6,971	0	0	....	6,821	34	0	498.5
Coldwater	6,234	3	0	48.1	6,229	10	0	160.5
Detroit	358,159	18	0	5.0	333,504	80	.8	24.0
Escanaba	12,647	1	0	7.9	11,679	15	0	128.4
Flint	16,665	2	0	12.0	15,552	11	.3	70.7
Grand Haven	5,735	0	0	....	5,425	12	0	221.2
Grand Rapids	103,871	31	0	29.8	98,776	81	9	82.0
Hancock	8,024	0	0	....	6,782	0	0	....
Hillsdale	5,467	0	0	....	5,056	6	.5	118.7
Holland	10,142	1	0	9.9	9,407	13	0	38.2
Houghton	5,333	0	0	....	4,715	0	0	....
Ionia	5,235	15	0	286.5	5,227	3	0	57.4
Iron Mountain	7,928	0	0	....	8,339	1	0	12.0
Ironwood	10,333	0	0	....	10,137	0	0	....
Ishpeming	9,991	0	0	....	11,011	0	0	....
Jackson	25,420	12	0	47.2	25,345	29	4	114.4
Kalamazoo	35,160	17	0	48.4	31,799	15	0	47.2
Lansing	24,067	21	0	87.3	21,698	23	0	106.0
Laurium	9,664	0	0	....	8,407	0	0	....
Ludington	7,352	21	1	285.6	7,294	9	0	123.4
Manistee	11,156	36	0	322.7	12,126	30	0	247.4
Manistique	5,066	0	0	....	4,773	3	0	62.9
Marquette	11,272	0	0	....	10,893	.3	0	2.8
Menominee	9,374	1	0	10.7	10,451	1	0	9.6
Monroe	7,213	0	0	....	6,535	4	.3	61.2
Mt. Clemens	7,640	0	0	....	7,308	4	.3	54.7
Mt. Pleasant	5,306	1	0	18.8	4,793	5	0	104.3
Muskegon	20,976	109	0	519.6	20,927	7	.3	33.4
Negaunee	6,659	1	0	15.0	6,746	.5	.3	7.4
Norway	5,558	0	0	....	5,125	1	0	19.5
Owosso	9,594	0	0	....	9,314	21	0	225.5
Petoskey	5,087	2	0	39.3	5,149	8	.3	155.4
Pontiac	11,999	1	0	8.3	11,302	5	0	44.2
Port Huron	20,898	34	1	162.7	20,355	2	0	9.8
Saginaw	50,875	184	0	361.7	48,210	103	.5	213.6
St. Joseph	5,489	1	0	18.2	5,385	.5	0	9.3
Saulte Ste. Marie	12,346	45	0	364.5	11,781	5	0	42.4
Traverse City	13,067	11	0	84.2	11,924	17	0	142.6
Wyandotte	5,667	0	0	....	5,516	3	.3	54.4
Ypsilanti	7,796	0	0	....	7,666	9	0	117.4

* Population estimated for intercensal years.

† Does not include West Bay City for 1904, which was consolidated with Bay City in 1905.

THE REPORTED SOURCES OF CONTAGIUM IN SMALLPOX.

Table 76 indicates that in but twenty-nine per cent of the outbreaks of smallpox that occurred in the years 1906-8 was the source of contagium traced and reported to this Department. It may be seen that sixty-two per cent of the outbreaks in which the source was traced was due to the movement, from one locality to another, of persons suffering from or who had been exposed to smallpox. In very many instances the disease was so mild that the patients did not call in a physician or take to their beds, and in this way, many of them were enabled to move from place to place without hindrance by the local health officials.

The places from which and to which smallpox was spread in 1908 are shown in Table 77.

TABLE 76.—*The reported sources of contagium in smallpox, in Michigan, in the three years, 1906-1908, as indicated by the number and per cent of instances in which each of the given sources was responsible for the introduction of the disease into a household.*

Sources.	Number of instances.	Per cent of all instances in which a source was given.
Outside jurisdiction	439	62
Traced to former cases in same locality	266	37
Infected clothing, mail, etc	7	1
Not stated, or statements doubtful	1,774	*71

* Per cent of all households in which smallpox occurred.

TABLE 77.—*Smallpox in Michigan. Localities from which and to which the disease was spread, during the year 1908.*

Spread from:	To:	Spread from:	To:
Allegan county, Ganges township.	Allegan county, Casco township.	Calhoun county, Battle Creek city.	Muskegon county, Muskegon city.
Alpena county, Maple Ridge township.	Alpena county, Long Rapids township.	Calhoun county, Convis township.	Calhoun county, Pennfield township.
Barry county, Assyria township.	Calhoun county, Battle Creek city.	Calhoun county, Marengo township.	Calhoun county, Leroy township.
Barry county, Castleton township.	Barry county, Maple Grove township.	Calhoun county, Marshall city.	Calhoun county, Marengo township.
Barry county, Nashville village.	Eaton county, Chester township.	Cass county, Cassopolis village.	Cass county, Calvin township.
Benzie county, Bensonia township.	Benzie county, Homestead township.	Cass county, Cassopolis village.	Cass county, Dowagiac city.
Berrien county, Chickaming township.	Berrien county, Buchanan township.	Eaton county, Eaton Rapids city.	Hillsdale county, Somerset township.
Calhoun county, Albion city.	Calhoun county, Marengo township.	Emmet county, Petoskey city.	Emmet county, Bear Creek township.
Calhoun county, Albion city.	Kalamazoo county, Kalamazoo city.	Grand Traverse county, Traverse City city.	Benzie county, Inland township.
Calhoun county, Battle Creek city.	Barry county, Middleville village.	Gratiot county, (No locality given.)	Saginaw county, Lakefield township.
Calhoun county, Battle Creek city.	Barry county, Rutland township.	Houghton county, Hancock city.	Houghton county, Calumet township.
Calhoun county, Battle Creek city.	Calhoun county, Bedford township.	Houghton county, Houghton village.	Wexford county, Cadillac city.
Calhoun county, Battle Creek city.	Calhoun county, Convis township.	Huron county, Fair Haven township.	Huron county, Hume township.
Calhoun county, Battle Creek city.	Calhoun county, Leroy township.	Huron county, Meade township.	Huron county, Hume township.
Calhoun county, Battle Creek city.	Eaton county, Vermontville township.	Huron county, Pigeon village.	Huron county, McKinley township.
Calhoun county, Battle Creek city.	Eaton county, Vermontville village.	Huron county, Winsor township.	Huron county, Fair Haven township.

TABLE 77.—CONTINUED.

Spread from:	To:	Spread from:	To:
Ionia county, Easton township.	Clinton county, Bath township.	Kent county, Grand Rapids city.	Kent county, Byron township.
Ionia county, Easton township.	Ionia county, Ionia city.	Kent county, Grand Rapids city.	Kent county, Paris township.
Ionia county, Ionia city.	Wexford county, Selma township.	Kent county, Grand Rapids city.	Kent county, Walker township.
Ionia county, Orange township.	Ionia county, Ionia city.	Kent county, Grand Rapids city.	Kent county, Wyoming township.
Jackson county, (No locality given.)	Osceola county, Burdell township.	Kent county, Grand Rapids city.	Lake county, Luther village.
Jackson county, Springport village.	Calhoun county, Clarence township.	Kent county, Grand Rapids city.	Manistee county, Manistee city.
Jackson county, Springport village.	Jackson county, Concord township.	Kent county, Grand Rapids city.	Missaukee county, Richland township.
Jackson county, Springport village.	Jackson county, Parma township.	Kent county, Grand Rapids city.	Ottawa county, Coopersville village.
Kalamazoo county, Vicksburg village.	Kalamazoo county, Brady township.	Kent county, Grand Rapids city.	Wexford county Cedar Creek township.
Kent county, Cedar Springs village.	Kent county, Ada township.	Lake county, Baldwin village.	Grand Traverse county, Paradise township.
Kent county, Cedar Springs village.	Kent county, Algoma township.	Lake county, Chase township.	Newaygo county, Barton township.
Kent county, Cedar Springs village.	Kent county, Courtland township.	Lapeer county, Imlay City village.	Tuscola county, Vassar village.
Kent county, Cedar Springs village.	Kent county, Oakfield township.	Lenawee county, Adrian city.	Genesee county, Flint city.
Kent county, Cedar Springs village.	Kent county, Spencer township.	Lenawee county, Hudson city.	Calhoun county, Battle Creek city.
Kent county, Cedar Springs village.	Montcalm county, Reynolds township.	Lenawee county, Medina township.	Lenawee county, Seneca township.
Kent county, Grand Rapids city.	Barry county, Thornapple township.	Macomb county, Memphis village.	St. Clair county, Riley township.

TABLE 77.—CONTINUED.

Spread from:	To:	Spread from:	To:
Manistee county, Manistee city.	Manistee county, Bear Lake township.	Oceana county, Crystal township.	Oceana county, Elbridge township.
Manistee county, Manistee city.	Manistee county, Dickson township.	Oceana county Colfax township.	Oceana county, Leavitt township.
Manistee county, Manistee city.	Manistee county, Filer township.	Oceana county, Hart village.	Allegan county, Casco township.
Manistee county, Manistee city.	Manistee county, Manistee township.	Oceana county, Hesperia village.	Benzie county, Benzonia village.
Manistee county, Manistee city.	Mason county, Ludington city.	Oceana county, Hesperia village.	Newaygo county, Fremont village.
Manistee county, Manistee city,	Wexford county, Cadillac city.	Oceana county, Leavitt township.	Oceana county, Colfax township.
Manistee county, Manistee city.	Wexford county, Mesick village.	Oceana county, Leavitt township.	Oceana county, Elbridge township.
Mason county, Ludington city.	Mason county, Riverton township.	Osceola county, Evart village.	Isabella county, Mt. Pleasant city.
Mason county, Ludington city.	Oceana county, Weare township.	Osceola county, Evart village.	Osceola county, Osceola township.
Mason county, (No locality given.)	Manistee county, Filer township.	Osceola county, Evart village.	Osceola county, Sylvan township.
Menominee county, Menominee city.	Delta county, Baldwin township.	Ottawa county, Coopersville village.	Ottawa county, Allendale township.
Missaukee county, (No locality given.)	Wexford county, Manton village.	Ottawa county, Holland city.	Ottawa county, Holland township.
Muskegon county, Muskegon city.	Muskegon county, Whitehall village.	Saginaw county, Carrolton township.	Saginaw county. Saginaw city.
Newaygo county, Fremont village.	Newaygo county, Denver township.	Saginaw county, Saginaw city.	Genesee county, Clio village.
Oakland county, Avon township.	Oakland county, Rochester village.	Saginaw county, Saginaw city.	Midland county Geneva township.
Oakland county, Rochester village.	Oakland county, Avon township.	Saginaw county, Saginaw city.	Saginaw county, Buena Vista township.

TABLE 77.—CONTINUED.

Spread from:	To:	Spread from:	To:
Saginaw county, Saginaw city.	Tuscola county, Gilford township.	Van Buren county, Keeler township.	Berrien county, St. Joseph city.
St. Clair county, Grant township.	St. Clair county, Fort Gratiot township.	Wayne county, Detroit city.	Genesee county, Flint city.
St. Clair county, Port Huron City.	Emmet county, Alanson village.	Wayne county, Detroit city.	Lapeer county, North Branch village.
St. Clair county, Riley township.	Macomb county, Richmond township.	Wayne county, Detroit city.	Monroe county, Berlin township.
St. Joseph county, Sherman township.	St. Joseph county, Burr Oak township.	Wayne county, Detroit city.	St. Clair county, Greenwood township.
St. Joseph county, Three Rivers city.	Van Buren county, Porter township.	Wexford county, Boon township.	Wexford county, Mesick village.
Sanilac county, Croswell city.	Sanilac county, Worth township.	Wexford county, Boon township.	Wexford county, Selma township.
Sanilac county, Delaware township.	Sanilac county, Deckerville village.	Wexford county, Cadillac city.	Missaukee county, Bloomfield township.
Sanilac county, Fremont township.	St. Clair county, Greenwood township.	Wexford county, Manton village.	Kalkaska county, Kalkaska village.
Sanilac county, Fremont township.	Sanilac county, Worth township.	Wexford county, Manton village.	Missaukee county, Norwich township.
Sanilac county, (No locality given.)	Ogemaw county, Churchill township.	Wexford county, (No locality given.)	Kalkaska county, Orange township.
Sanilac county, Worth township.	St. Clair county. Grant township.	Wexford county, (No locality given.)	Lake county, Marlborough village.
Tuscola county, Vassar village.	Tuscola county, Tuscola township.	FROM OUTSIDE THE STATE TO LOCALITIES IN MICHIGAN.	
Van Buren county, Antwerp township.	Kalamazoo county, Texas township.	Canada, (No locality given.)	Alcona county, Harrisville township.
Van Buren county, Columbia township.	Van Buren county, Arlington township.	Canada, (No locality given.)	Ogemaw county, Rose City city.
Van Buren county, Columbia township.	Van Buren county, Bloomingdale village.	Illinois, Chicago.	Charlevoix county, Boyne City city.

TABLE 77.—CONCLUDED.

Spread from:	To:
Illinois, Chicago.	St. Joseph county, Burr Oak township.
Illinois, Highwood.	Berrien county, Niles city.
Illinois, Odell.	St. Joseph county, Burr Oak township.
Illinois, Odell.	St. Joseph county, Burr Oak village.
Illinois, Odell.	St. Joseph county, Sherman township.
Illinois, Odell.	St. Joseph county, Sturgis city.
Indiana, Angola.	Branch county, Gilead township.
Indiana, Elkhart.	Cass county, Ontwa township.
Indiana, (No locality given.)	Berrien county, Bertrand township.
Indiana, Pleasant Lake.	Branch county, Kinderhook township.
Indiana, South Bend.	Berrien county, Berrien township.
Minnesota, Duluth.	Houghton county, Laird township.
Minnesota, Minneapolis.	Van Buren county, Paw Paw township.
Minnesota, (No locality given.)	Alcona county, Haynes township.
Minnesota, (No locality given.)	Gratiot county, Lafayette township.
Montana, (No locality given.)	Mecosta, Big Rapids city.
Ohio, Lima.	Kent county, Algoma township.
Ohio. Lima.	Kent county, Rockford village.
Ohio, Lima,	Lenawee county, Medina township.
Oklahoma, (No locality given.)	Cass county, Dowagiac city.
Oklahoma, (No locality given.)	Eaton county, Vermontville village.
Ontario, London.	Ingham county, Lansing city.
South Dakota, (No locality given.)	Berrien county, Chickaming township.
Texas, (No locality given.)	Ingham county, Lansing city.
Washington, Spokane.	St. Clair county, Burtchville township.

RESTRICTIVE AND PREVENTIVE MEASURES IN SMALLPOX.

Placarding, isolation and disinfection.—Table 78 indicates that in but eighty-one per cent of the households in which smallpox occurred in 1906-8 were the restrictive measures of placarding, isolation and disinfection enforced. In the case of the 19 per cent of households where the restrictive measures were probably not carried out, the neglect may have been due to the fact that, in many instances, owing to the mild character of the disease, the health officer was not satisfied with the diagnosis, or was not notified in time to institute these restrictive measures, particularly those of placarding and isolation. In nearly every outbreak investigated by this Department, since the present mild type of smallpox became widespread, in which the disease was in doubt, it has proven to be smallpox; and very many cases of smallpox might have been prevented each year if the health officers had adopted the policy of giving the public the benefit of the doubt by the prompt institution of restrictive measures.

Vaccination of sick persons.—Table 78 indicates that seventy-two, and, possibly, eight-eight, per cent of all persons sick from smallpox in 1907-8 had not been vaccinated. This section of Table 78 may well be studied in connection with Table 78A, in which is shown the periods of time which elapsed between vaccination and sickness from smallpox, in certain instances, in the years 1904-8.

TABLE 78.—*Restrictive and preventive measures in smallpox, in Michigan, in the three years, 1906-1908.*

Restrictive and preventive measures.	Number.	Per cent of all cases or households.
PLACARDING, ISOLATION AND DISINFECTION:		
Households in which enforced	2,005	81
Neglected	178	7
Not stated, or statements doubtful	303	12
VACCINATION OF SICK PERSONS:		
Cases vaccinated at commencement of or prior to sickness*	608	12
Not vaccinated	3,774	72
Not stated, or statements doubtful	876	16

* The time of vaccination of sick persons in 1904-1908 is shown in Table 78A.

TABLE 78A.—*The time which elapsed between previous vaccination and the beginning of sickness in smallpox patients, in Michigan, in the five years, 1904-1908.**

Time	Same day.	1 day.	3 days.	4 days.	5 days.	7 days.	9 days.	10 days.	14 days.	21 days.	1 mo.
No. of cases	60	6	5	1	10	7	1	4	1	3	4
Time	2 Mos.	4 Mos.	1 yr.	2 yrs.	3 yrs.	4 yrs.	5 yrs.	6 yrs.	7 yrs.	8 yrs.	9 yrs.
No. of cases	1	1	19	119	64	46	43	28	11	10	5
Time	10 yrs.	11 yrs.	12 yrs.	13 yrs.	14 yrs.	15 yrs.	16 yrs.	17 yrs.	20 yrs.	21 yrs.	24 yrs.
No of cases	19	1	5	5	1	9	3	2	47	2	1
Time	25 yrs.	26 yrs.	30 yrs.	31 yrs.	35 yrs.	40 yrs.	43 yrs.	45 yrs.	40 yrs.	53 yrs.	55 yrs.
No. of cases	12	3	18	1	3	9	1	1	4	1	1
Time	60 yrs.	1-2 yrs.	1-10 yrs.	2-10 yrs.	2-40 yrs.	3-4 yrs.	7-13 yrs.	3-20 yrs.	3-45 yrs.	5-25 yrs.	6-8 yrs.
No. of cases	3	1	1	5	24	1	4	8	3	1	1
Time	7-8 yrs.	7-18 yrs.	8-15 yrs.	10-12 yrs.	10-14 yrs.	10-15 yrs.	12-14 yrs.	15-20 yrs.	20-25 yrs.	20-30 yrs.	30-40 yrs.
No. of cases	2	2	1	9	2	8	3	1	2	1	2

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* There were 512 cases, not included in this Table, which had been vaccinated prior to the sickness from smallpox, but in which the time of vaccination was indefinite or not stated.

Results of restrictive measures.—Table 79 and accompanying diagram are somewhat similar to tables and diagrams, relative to the results of restrictive measures in smallpox, in the annual reports of this Department ending with the year 1904, the principal difference being that the disease is now studied by *households* instead of *outbreaks.* It is believed that, with a continuation of the table for a number of years, a much better, and certainly a much more reliable, showing can be made than in the preceding reports.

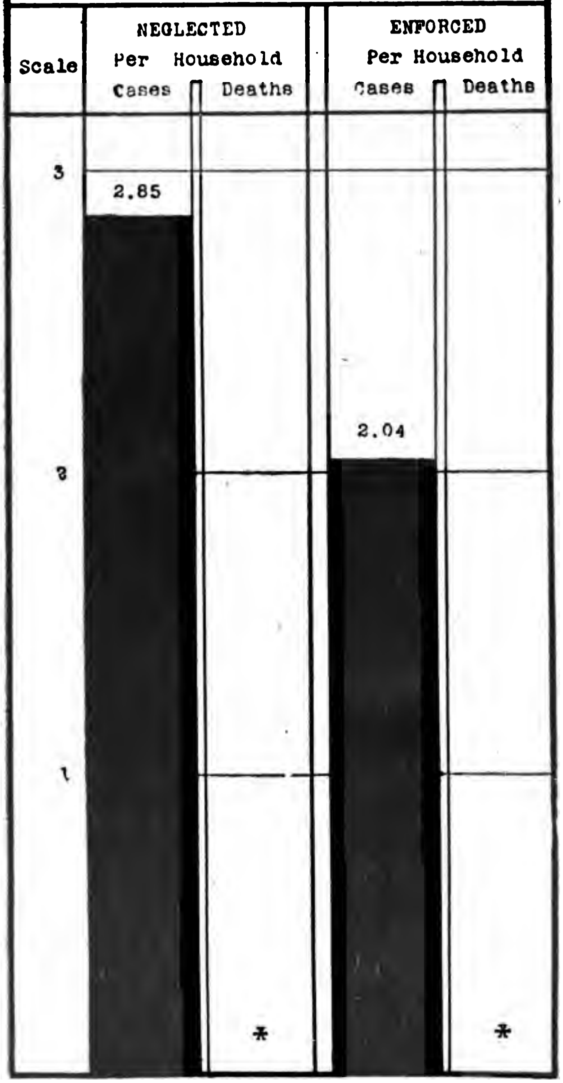
TABLE 79.—*Showing the total number of households in which smallpox was present during the three years, 1906-1908, together with the total number of cases and deaths and the average number of cases in each household in which the restrictive measures were enforced or neglected.*

	Total number of households, 2,486.		Restrictive measures enforced in 1,975 households.		Restrictive measures neglected in 178 households.	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Totals	5,258	19	4,020	18	508	0
Average number per household	2.12	*	2.04	*	2.85	0

* The average deaths per household are too small to be considered.

SMALLPOX RESTRICTED
BY ISOLATION AND DISINFECTION.

Average numbers of cases and deaths per household in households in which restrictive measures were Neglected and in households in which restrictive measures were Enforced during the three years, 1906-1908.



* The average deaths per household are too small to be considered.

SPECIAL INVESTIGATIONS, BY THE SECRETARY OF THIS BOARD, IN 1908, OF OUTBREAKS OF SMALLPOX.

Upon invitation of the local authorities, in 1908, the Secretary of this Board made visits to the undermentioned localities, on the dates named, for the purpose of assisting in the diagnosis of cases suspected to be smallpox and in the institution of restrictive and preventive measures.

Jackson, January 4.—The disease was introduced into Jackson by a returned convict and many persons were exposed; but, by prompt and energetic measures for the restriction of the disease, a serious outbreak among the prisoners in the State Prison was averted.

Salem Township, Washtenaw County, January 20.—The disease in this outbreak was believed to be smallpox but was diagnosed by the Secretary of this Board as Chicken-pox.

Albion City and Marengo Township, Calhoun County and Centerville Village, St. Joseph County, January 27 to 29.—There was nothing in these outbreaks worthy of special mention here.

Nashville Village and Maple Grove Township, Barry County, February 5.—In this outbreak it was found that a mail carrier had been over his entire route after the eruption had appeared; but, by the prompt and active measures instituted for the prevention of the spread of the disease, the outbreak was limited to five cases, including the mail carrier.

Springfield Township, Oakland County, February 29.—Two disputed cases in this outbreak were found to be smallpox, and as the disease had first broken out in the schoolhouse, free vaccination of all the school-children was recommended and the recommendation was acted upon by the local board of health.

Ionia, March 10 and 26.—The disease was introduced into the State Reformatory by a prisoner from the north woods, and fifty or sixty cases resulted therefrom. Strict quarantine, disinfection and general vaccination soon brought the outbreak under control.

Fremont, March 17.—The disease began in the schools and there was quite general exposure. Schools, churches and public halls were closed and general vaccination was ordered.

Kalamazoo, April 20.—The disease had been present at Recreation Park for some time previous and the Secretary of this Board had made an investigation of the outbreak in the latter part of March. In the third week of April the disease broke out in the extensive print shop and bindery of Ihling Bros. & Everard and the Secretary was again called to assist the local board of health in the restriction of the disease. The question of quarantining the entire establishment was considered, and it was decided that the quarantining of the particular department where the patient had worked, the vaccination of all of the employes and the disinfection of the other departments would be sufficient. It was also arranged that the health officer make daily visits to the institution during quarantine. No new cases developed during the quarantine which lasted for sixteen days.

Cassopolis, May 13 and 14.—Owing to the very mild character of some of the cases in this outbreak, the disease had been diagnosed as "Impetigo Contagiosa" and had been permitted to become epidemic. A public meeting was called by the President of the village at the time of the Secretary's visit and restrictive measures were inaugurated, with the result that, within four weeks time, the outbreak was controlled.

Capac, May 29.—In the early part of this outbreak, there was some dispute as to the diagnosis, although the initial history of the case, together with the characteristic pustules, indicated smallpox. As soon as the nature of the disease was fully understood, active measures for its restriction were inaugurated and the outbreak was soon controlled.

Leroy Township, Calhoun County, June 1.—These outbreaks occurred in Sonoma and East Leroy, and were quite severe. The usual advice was given to the local authorities relative to the restriction of the disease.

Honor Village, and Townships of Platte and Homestead, Benzie County, August 10 and 11.—There was nothing in these outbreaks worthy of special mention here.

CHICKEN-POX (VARICELLA) IN MICHIGAN IN 1908.

During the year ending December 31, 1908, chicken-pox was reported present in 15 localities in the State, 91 households being infected, with a total of 147 cases, including one death.

So far as known, the restrictive measures of isolation and disinfection were fully carried out in but 43 of the 91 households, but this is a marked improvement over former years.

MUMPS (PAROTITIS) IN MICHIGAN IN 1908.

During the year 1908, three cases of mumps (parotitis), including one death, were reported from three localities in the State.

ERYSIPELAS IN MICHIGAN IN 1908.

During the year 1908, reports were received relative to 113 cases of erysipelas, in the State, 103 of which proved fatal.

So far as could be learned, there was no connection between these cases and any of the cases of puerperal fever reported to this Department.

PUERPERAL FEVER IN MICHIGAN IN 1908.

During the year 1908, 144 deaths from puerperal fever were reported, but this number must not be taken as including all the cases of puerperal fever that occurred in the State in that year, because the reports of this disease are very meagre, and, as a rule, first information of cases of the disease are obtained from the death certificates returned to the Secretary of State.

ITCH (SCABIES) IN MICHIGAN IN 1908.

During the year 1908, three outbreaks of itch were reported to this Department.

TETANUS (LOCK-JAW) IN MICHIGAN IN 1908.

During the year 1908, there were reported to this Department, from thirty localities in the State, thirty-three cases of tetanus, thirty-one of which terminated fatally.

Of the thirty-three cases, in which a source of infection was reported, six were due to wounds from rusty nails; four to gun-shot wounds; three to injury to foot; three to infection in an open wound, and one each to the following causes:

Wound on forehead, wound in hand caused by piece of wood, blank cartridge wound, wound in ear, crushed hand, wound on scalp, result of fall and cut by an old knife.

In fifteen instances, the average period of incubation (from the time of the wound or injury until tetanus developed) was 7.9 days.

In twenty-three instances, the average duration of sickness in fatal cases (from the time tetanus developed until death occurred) was 5.5 days.

The average ages of all persons suffering from tetanus were: For males 24.6, and for females 18.3.

In Part I. of this annual report is printed a statement relative to the efforts put forth by this Department during the fiscal year 1909 for the prevention of tetanus.

TYROTOXICON POISONING IN MICHIGAN IN 1908.

In February, 1908, an outbreak of tyrotoxicon poisoning occurred at Highland Park, members of at least eight families being affected, but no deaths occurred therefrom. The County Chemist of Wayne county, who investigated the outbreak, stated that the disease was caused by eating cheese made from milk that was transported to the factory in unclean cans.

DYSENTERY IN MICHIGAN IN 1908.

During the year 1908, 166 deaths from dysentery were reported to this Department by the Secretary of State, but no information was received from health officers of any of the localities, in which the deaths occurred, relative to the probable sources of the disease.

DISEASE OF ANIMALS, DANGEROUS TO MAN, IN MICHIGAN, IN 1908.

Whenever information is received at this office of the occurrence of an outbreak of any disease of animals, which, by reason of its communicability, may be considered dangerous to man, efforts are made to learn all facts relative to such outbreaks. The matter is reported to the State Live Stock Sanitary Commission, and the attention of the health officials of the locality where the disease is reported present is called to the fact of its reported prevalence, and they are requested to take immediate measures for the prevention of its spread, by establishing and maintaining quarantine over the diseased animals, until relieved by the State Live Stock Sanitary Commission.

During the year 1908, only one disease of this character was reported to this Department, that being rabies (hydrophobia).

RABIES (HYDROPHOBIA) IN MICHIGAN IN 1908.

During the year 1908, one death from rabies was reported to this Department. The case was that of a boy eleven years old, residing in Buchanan village, Berrien county. No particulars, other than those contained in the death certificate, were received relative to this case.

ALLEGED NUISANCES IN MICHIGAN, IN 1908.

During the year 1908, communications relative to 124 alleged nuisances in Michigan were received at the office of the Secretary of this Board.

The causes, to which the alledged nuisances mentioned in the communications were attributed, may be classified as follows:

Slaughter houses, 16; refuse dumped on ground, 15; stagnant water, 14; pollution of streams, 13; unburied and insufficiently buried animals, 13; barnyard and manure heaps, 10; insanitary houses, 8; pig-pens, 7; sewers, 6; cesspools, 4; open drains, 4; closets, 3; pollution of lakes, 3; chicken-coops, 2; fertilizer spread on ground, 2; waste from tannery, 1; weeds, 1; calves placed on market that were butchered when 2 weeks old, 1; garbage barrels, 1.

Whenever a complaint of an alleged nuisance is received at this office, the health officer, whose duty it is to act, is usually informed of the nature of the nuisance, and is requested to investigate the same. At the same time, the sections of law and pamphlets, publications of this Board, pertaining to nuisances and to the duties of local boards of health relative thereto, are sent to him and to the person making the complaint.

The State Board of Health had no authority, under the old law, to abate nuisances, simply advising local boards of health in regard thereto, but the new law, Act 293, P. A. 1909, which will be found in Part I. of this report, confers that power on this Board through its medical inspector, who shall act under the direction of the State Board of Health. This Board will exercise this authority only in cases where the local boards refuse or neglect to do their duty.

INDEX—REPORT FOR 1909.

Page.
Albion, investigation of smallpox at, 193
Antitoxin (see Diphtheria).

Bacteriological laboratory, miscellaneous examinations in 36
  report of the work in 29–36
  summary of examinations in 29–36
Bacteriologist, State, amendment to act providing for appointment of 44–45
Benton Harbor, report on proposed additional water supply for 23
Board of Health, State, act relative to public health 53–54
  annual reports of 15
  expenditures by the 38–39
  general and special work in office of 14–29
  members of the 5
  movements of the secretary of 20–21
  regular and special meetings of 11–13
  report relative to the work in the laboratory of the 29–36
Boards of education, advice to 20–29
  health, local, act defining the powers of 39–42
    advice to 20–29
  townships, act relative to acquiring burying grounds by 50–53
Bulletins, "Public Health, Michigan," fiscal year, 1909 16–17

Campbell township, Ionia county, investigation of scarlet fever at 166
Capac, investigation of smallpox at 194
Cassopolis, investigation of smallpox at 193
Centerville, investigation of smallpox at 193
Chicken-pox (Varicella) in Michigan in 1908 194
Communicable diseases (indexed "Diseases, communicable").
Compilation, methods of 68
  purposes of 67
Consumption (see tuberculosis).

Dead bodies, unclaimed, act relative to disposal of 46–49
Diet, hot weather, placards relative to 17–18
Diphtheria, in Michigan, antitoxin treatment in 145–147
  in 1908 and preceding years 132–147
  general prevalence of 132–134
  geographical distribution of 134–136
  prevalence of in urban and rural localities 136–138
  restrictive and preventive measures in 141–147
  sources of contagium in 139–141
  spread from one locality to another 140–141
  laboratory work in connection with 33–35
Diseases, communicable, amendment to act providing for teaching prevention of in public schools 46
  amendment to act relative to introduction of 50
  in Michigan, in 1908 and preceding years 67–196
  of animals, dangerous to man, in Michigan, in 1908 196
Dogs, rabies among, act providing for payment of damages due to 54–55
Drowned, placards relative to the resuscitation of the 17
Dysentery, in Michigan, in 1908 195

Eaton Rapids, investigation of typhoid fever at 132
Embalmers, examination and licensing of 13
Erysipelas, in Michigan, in 1908 194
Escanaba, report on filtration plant at 21

Page.

Fever, puerperal, in Michigan, in 1908 194
  scarlet, in Michigan, general prevalence of 153–155
    geographical distribution of 155–157
    in 1908 and preceding years 153–166
    prevalence of in urban and rural localities 157–159
    restrictive and preventive measures in 162–165
    sources of contagium in 160–162
    spread from one locality to another 161–162
   special investigations of by secretary 166
  typhoid, in Michigan, general prevalence of 114–116
    geographical distribution of 116–119
    in 1908 and preceding years 114–132
    prevalence of in urban and rural localities 119–122
    restrictive and preventive measures in 129–131
    sources of contagium in 122–129
    spread from one locality to another 125–129
   special investigations of by secretary 132
Financial report, of the State Board of Health 38–39
Flies poison food, placards relative to 18
Food, flies poison, placards relative to 18
Fowler village, report of insanitary conditions in 28–29
Fremont, investigation of smallpox at 193

Homestead township, Benzie county, investigation of smallpox at 194
Honor, investigation of smallpox at 194
Hospitals and sanatoria, act relative to construction and maintenance of 45–46
Hydrophobia (indexed "Rabies").

Information, collection of 14
  dissemination of 14–19
Ionia, investigation of smallpox at 193
Itch (Scabies) in Michigan in 1908 195

Jackson, investigation of smallpox at 193

Kalamazoo, investigation of smallpox at 193

Laboratory (see Bacteriological laboratory).
Lake Odessa, report on disposal of sewage at 21–22
Legislation, in 1909, public health 39–57
Leroy township, Calhoun county, investigation of smallpox at 194
Livingston county, report relative to county ditch in 25
Lock-jaw (indexed "Tetanus").

Maple Grove township, Barry county, investigation of smallpox at 193
Marengo township, Calhoun county, investigation of smallpox at 193
Measles, in Michigan, general prevalence of 166–167
    geographical distribution of 168–170
    in 1908 and preceding years 166–176
    restrictive and preventive measures in 174–176
    sources of contagium in 170–174
    spread from one locality to another 172–174
Meningitis, in Michigan, duration of sickness in 112–113
    general prevalence of 103–104
    geographical distribution of 105–107
    in 1908 and preceding years 103–114
    influence of age and sex in 111–112
    prevalence of in urban and rural localities 107–109
    restrictive and preventive measures in 113–114
    seasonal prevalence of 110
    sources of contagium and predisposing influences in 110–111
    tubercular and traumatic, 1899-1908 105
Michigan State Sanatorium, report relative to the 58–63
Monroe, report of water supply of 27
  report on sewerage system of 22–23
Mumps (Parotitis) in Michigan in 1908 194

Page.

- Nashville, investigation of smallpox at 193
- Neostyle work, summary of 15
- Nuisances, alleged, in Michigan, in 1908 196
- Nurses, act relative to examination, regulation, licensing and registration of 55–57

- Parotitis (indexed "Mumps").
- Perry, report on heating and ventilation of schoolhouse at 23–25
- Plans for State buildings, examination of 13
- Platte township, Benzie county, investigation of smallpox at 194
- Pneumonia, in Michigan, duration of sickness in 76–77
  - general prevalence of 68–69
  - geographical distribution of 69–71
  - in 1908 and preceding years 68–82
  - influence of age and sex in 74–75
  - influence of occupation in 80–81
  - period of incubation in 76, 79
  - predisposing influences in 76, 78
  - prevalence of in urban and rural localities 71–73
  - restrictive and preventive measures in 81–82
  - seasonal prevalence of 74
  - sources of contagium in 76, 79
- Public health, amendment to act relative to preservation of 43–44
- Puerperal fever (indexed "Fever, puerperal").

- Rabies, among dogs, act providing for payment of damages due to 54–55
  - (Hydrophobia) in Michigan in 1908 196
- Railroad passenger coaches, depots and vessels, act providing for sanitary conditions in 49
- Reports, general plan of 68

- St. Clair, investigation of typhoid fever at 132
- Salem township, Washtenaw county, investigation of smallpox at 193
- Sanitary engineer, work in the division of 21–29
- Scabies (indexed "Itch").
- Scarlet fever (indexed "Fever, scarlet").
- School work 19
- Smallpox, in Michigan, efficiency of vaccination in 190
  - general prevalence of 176–177
  - geographical distribution of 178–180
  - in 1908 and preceding years 176–194
  - prevalence of in urban and rural localities 180–182
  - restrictive and preventive measures in 189–192
  - sources of contagium in 183–188
  - spread from one locality to another 184–188
  - special investigations of by secretary 193–194
- Spitting on sidewalks, warning relative to 18–19
- Springfield township, Oakland county, investigation of smallpox at 193
- State Board of Health, (indexed "Board of Health, State").

- Tetanus (Lock-jaw) in Michigan in 1908 195
- Tuberculosis exhibit, Michigan 37
  - in Michigan, bacteriological diagnosis of 103
    - civil condition of patients 93
    - duration of sickness in 100
    - general prevalence of 82–84
    - geographical distribution of 84–86
    - in 1908 and preceding years 82–103
    - influence of age and sex in 91–92
    - influence of color in 92–93
    - influence of occupation in 93–99
    - laboratory work in connection with 32–33
    - location of the disease in cases of 89
    - predisposing influences and premonitory symptoms in 90–91
    - prevalence of in urban and rural localities 86–88
    - restrictive and preventive measures in 100–102
    - seasonal prevalence of 88–89
    - sources of contagium in 90

Typhoid fever (indexed "Fever, typhoid"). Page.
Tyrotoxicon poisoning, in Michigan, in 1908 ... 195

Vaccination (see restrictive and preventive measures in "Smallpox").
Varicella (indexed "Chicken-pox").

Water examinations, summary of ... 31–32
    potable ... 30–32
    works systems, act relative to supervision and control of ... 42–43
White Cloud, investigation of scarlet fever at ... 166
Whooping-cough, in Michigan, general prevalence of ... 147–149
    geographical distribution of ... 149–151
    in 1908 and preceding years ... 147–153
    restrictive and preventive measures in ... 152–153
    sources of contagium in ... 151–152
    spread from one locality to another ... 152
Wyandotte, report relative to school buildings at ... 25–26

age.
195

32
32
43
66
49
51
53
3
2
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